# User's Guide

# PowerChute® *plus*

## Version 4.2.2/4.2.3/4.2.4

## for UNIX

**APC**®

www.apcc.com

# User's Guide: PowerChute® *plus* 4.2.2/4.2.3/4.2.4 for UNIX™

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On-line tracking #: 1.3

May 17, 1999

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# Contents

# Introduction and Overview

This User's Guide provides information on how to use the PowerChute *plus* software to control and view the workings of your UPS supplied by American Power Conversion.

In the User's Guide any blue text — e.g. Organizational Overview in the next paragraph — indicates a **hypertext link** to another section of the guide. Click on it and you go to that section.

This chapter gives background information on the guide, including an **Overview of User's Guide**. Other topics include:

- **Typeface Conventions**
- **Technical Support**

See the **Glossary** for definitions of unfamiliar terminology in the User's Guide.

*Note:*
*Only 4.2.3 and 4.2.4 versions of the PowerChute plus software — Solaris for SPARC, AIX 3.x–4.x, SCO UnixWare 7 — have Symmetra Power Array support.*

## Overview of User's Guide

## Typeface Conventions

The following table identifies the typeface conventions used within this guide. When text is emphasized or in a different typeface then it's for one of the following reasons.

| Typeface | Examples |
|---|---|
| Various styles and typefaces highlight text references to:<br><br>• buttons<br><br>• events<br><br>• menu options<br><br>• field names<br><br>• file names | <br><br>• Click the **Cancel** button.<br><br>• ... generates an **On Battery** event.<br><br>• Select **UPS Operational Parameters...** in the **Configuration** menu.<br><br>• To change the **High Transfer Point** setting...<br><br>• To edit the **powerchute.ini** file... |
| The `Courier New font` highlights any text references to<br><br>• file data<br><br>• keyboard input | <br><br>• Change the `MeasureUps` value...<br><br>• Type `powerchute` and... |
| *Italicized* fonts highlight any text references to:<br><br>• items with variable definitions<br><br>• specific documents<br><br>More usually, it simply emphasizes a particular point. | <br><br>• *server_name*<br><br>• *PowerChute plus Installation Guide*<br><br><br>• This *never* happens in normal operation. |

# Technical Support

If you have questions concerning any APC product, contact the nearest APC Technical Support Center listed in the following table. APC provides technical support at no charge.

**APC Corporate Web Site (with links to international sites):**   http://www.apcc.com
**APC Japan Web Site:**   http://www.apc.co.jp
**APC North American Technical Support:**   http://support.apcc.com

**North America (US and Canada):**
    Toll Free:    +800 800-4272
    Fax:    401 788-2743
**LAM (Latin America)**
    E-mail:    apctchla@apcc.com
  **By Country:**
    Argentina:    08000-9-2722
    Brazil:    0800-127221
    Colombia:    980-15 39 47
    Mexico:    95 800 804 4283
    Uruguay:    000 413 598 2139
    Venezuela    8001 2856
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    Fax:    +353 91 755275
    E-mail:    apceurtech@apcc.com
  **By Country:**
    Austria:    Toll Free: 0660 6480
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    Finland:    Toll Free: 9800 13 374
    France:    Toll Free: 0800 906 483
    Germany:    Toll Free: 0130 818907
    Holland:    Toll Free: 0800 0224655
    Hungary:    Toll Free: 00800 12221
    Ireland:    Toll Free: 800 702000 ext. 2045
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    Italy:    Toll Free: 1678 74731
    Luxembourg:    Toll Free: 0800 2091
    Norway:    Toll Free: 800 11 632
    Poland:    Toll Free: 00800 353 1202
    Portugal:    Toll Free: 050 553182
    Russia:    +7 095 916 7166
    South Africa:    Toll Free: 0800 994206
    Spain:    Toll Free: 900 95 35 33
    Sweden:    Toll Free: 020 795 419
    Switzerland:    Toll Free: 0800 556177
    Turkey    Toll Free: 0800 35390275
    United Kingdom: Toll Free: 0800 132990

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  **ANZ (Australia, New Zealand):**
    Toll Free:    1800 652 725
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    Fax:    +88 622 755 1946
**ISB** (India, Nepal, Sri Lanka, Bangladesh, Maldives)
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# Chapter 1: How to Start Monitoring a UPS

This chapter gives a brief description of the components of PowerChute *plus* and also tells you how to start using the product.

The topics dealt with are:

- **What is PowerChute plus?**

- **Executable Files**

- **How to Start PowerChute plus**

*Note:*
*You should also read the following* .

## What is PowerChute *plus?*

The PowerChute *plus* software has two main components:

- **User Interface Module**: provides the interface between you and PowerChute *plus*

- **UPS Monitoring Module**: communicates with both the UPS and the User Interface Module
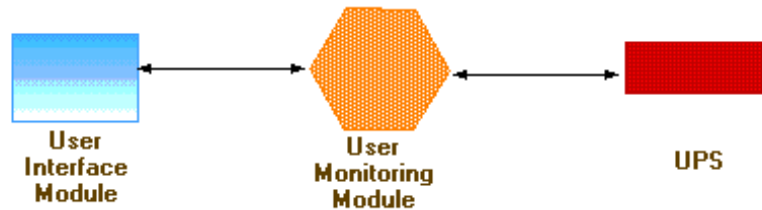


Together these modules provide for the following:

1. *Shutting down*, in an orderly fashion, the computer system on which the PowerChute *plus* application is running when an extended AC power failure occurs

2. *Notifying* users and network administrators of impending shutdowns

3. Recording *FlexEvents* and power data in log files

4. Automatic *restarting* of system when power returns

5. Conserving UPS *battery power*

6. Scheduling *shutdowns*

7. Interactive, scheduled *battery testing*

8. Real-time *bar-graph displays* of output voltage, UPS load data, and utility line voltage, as well as runtime remaining, capacity, and voltage values for the UPS battery

## Executable Files

PowerChute *plus* uses the following executable files to start the UPS Monitoring Module and the User Interface Module:

|  | **UPS Monitoring Module** | **User Interface Module** |
|---|---|---|
| **Character-based:** | upsd | powerchute |
| **X-Window:** | upsd | xpowerchute |

# How to Start PowerChute *plus*

The UPS Monitoring Module, **upsd**, starts automatically when you boot the computer where PowerChute *plus* is installed. The User Interface Module can be displayed in two different modes: Character-based and X-Window-based. The latter is a graphical user interface, allowing you to use a mouse. APC recommends using the X-Window-based interface where possible.

The **X-Window/Character displays on UNIX Platforms** section informs you which mode can be used with different varieties of UNIX.

To start the User Interface Module — character-based or X-Window-based:

1.  Log into your system as the `root` user.

2.  Change to the PowerChute *plus* installation directory.

3.

| **For Character-Based UNIX** | **For X-Window-Based UNIX** |
|---|---|
| Type `./powerchute` and press **Enter** | Type `./xpowerchute` and press **Enter** |

> The Monitor Server dialog box that then displays identifies the servers you can access. You can monitor a server's UPS only if the server uses PowerChute *plus* and connects directly to your system's subnetwork.

4.  Select a listed server to display the PowerChute *plus* Main Screen for that server's UPS and click OK or press Enter.
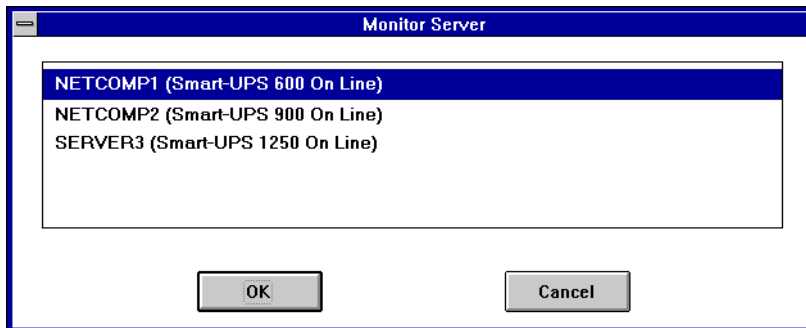


5.  At the Password dialog box, type the password and press OK.

> See **Chapter 2, PowerChute plus Main Screen** for a description of the Main Screen.

## X-Window/Character displays on UNIX Platforms

The following table lists UNIX platforms and the PowerChute *plus* interfaces supported on each.

| Operating System | Supported Versions | |
|---|---|---|
| IBM AIX | X-Window | Character |
| Solaris (SPARC) | X-Window, OpenWindows | Character |
| SunOS 4.1.3 and Solaris for Intel (X86) | - | Character |
| SCO Open Desktop | X-Window (ODT only) | Character |
| NCR UNIX | - | Character |
| SCO UnixWare 2.x | X-Window | - |
| SCO UnixWare 7 | X-Window | Character |
| Unisys UNIX | - | Character |
| HP-UX | X-Window | Character |
| SGI Irix | X-Window | - |
| Olivetti System V, Release 4 | - | Character |
| SINIX/RM series | - | Character |
| DEC OSF/1 | X-Window | - |

# Chapter 2: PowerChute *plus* Main Screen

This chapter describes the Main Screen of the PowerChute *plus* User Interface Module. For information on PowerChute components and starting the application, please see **Chapter 1, How to Start Monitoring a UPS**.

The Main Screen provides five drop-down menus and various windows giving information about your UPS and the computer system the UPS is monitoring.
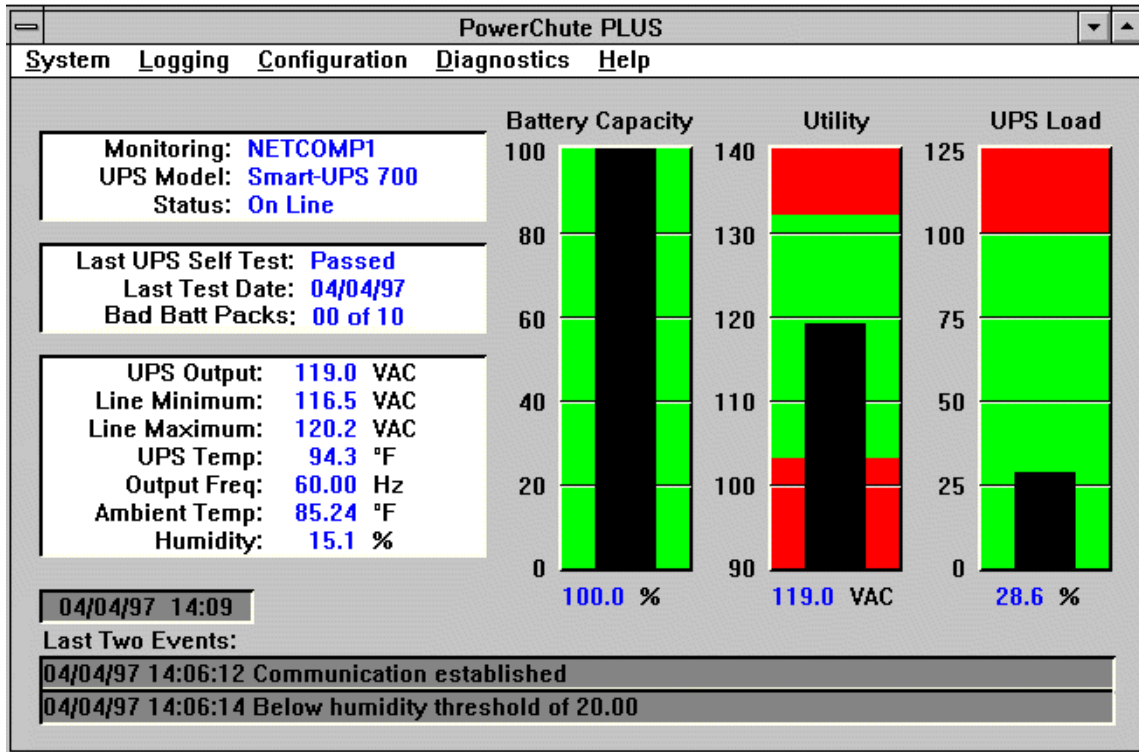


- A **Menubar** provides System, Logging, Configuration, Diagnostics, and Help options.

- Several windows provide status and other information about the UPS you are monitoring:
  **Hardware and Status Window**
  **Self-Test and Battery Information Window**
  **Data Fields Window**
  **Host Computer Date and Time Window**
  **Last Two Events Window**

- A **Bar Graph Area** displays three bar graphs. Note that only the left-hand bar graph is configurable.

The information displayed in the Main Screen can vary depending on the UPS you are monitoring.

**Screen Navigation in PowerChute plus** explains how to navigate PowerChute *plus* using only your keyboard.

## Menubar

The menubar at the top of the PowerChute *plus* Main Screen has the following four main menu options plus an on-line help option.

| Menu | Functions |
|---|---|
| **System**<br><br>(see **System Monitoring and Shutdown in Chapter 5**) | Besides exiting PowerChute *plus*, with this menu you can:<br>• monitor a different server<br>• schedule daily or weekly server shutdowns<br>• shut down a server immediately |
| **Logging**<br><br>(see **Logging Data in Chapter 6**) | View or print the Event Log/ Data Log, and set log options |
| **Configuration**<br><br>(see **How to Configure PowerChute plus in Chapter 3**) | Perform the following tasks:<br>• set UPS operating parameters (except for a Back-UPS)<br>• configure UPS shutdown parameters<br>• configure communication parameters<br>• Display fault tolerance data<br>configure event actions<br>• configure event users<br>• set Measure-UPS parameters (if a Measure-UPS is attached)<br>• select monitoring preferences (except for a Back-UPS) |
| **Diagnostics**<br><br>(see **Performing UPS Diagnostics in Chapter 7**) | Perform the following tasks (except for a Back-UPS):<br>• initiate UPS self-tests, run-time calibration, and UPS alarm tests<br>• simulate a power failure<br>• put the UPS in bypass mode (if you are using a Symmetra *Power Array* or Matrix-UPS) |

The following figure shows the menubar with all its drop-down menu options.
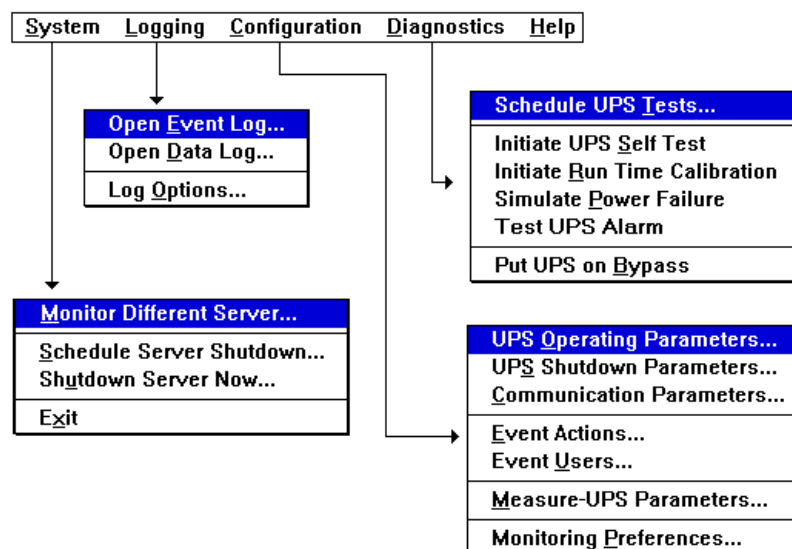
## Hardware and Status Window

```
Monitoring: NETCOMP1
UPS Model: SMART-UPS 700
    Status: On Line
```

The Hardware and Status window, located to the left and below the menubar of the Main Screen, displays the following fields:

| Label | Description |
|---|---|
| **Monitoring:** | Names the host computer for which you are viewing UPS data. |
| | On a network, you can be logged into one host computer while viewing the status of another host computer's UPS. |
| **UPS Model:** | The model name of the UPS being monitored by PowerChute *plus*. |
| **Status:** | The current status of the UPS. |
| | If two status changes occur simultaneously, PowerChute *plus* displays the status indicator for the more serious of the two. |
| | Please see **List of UPS Statuses**. |

### List of UPS Statuses

The table below lists the possible statuses of your UPS. They display beside the **Status:** label on the Main Screen of PowerChute *plus*; see **Hardware and Status Window** for further information.

| UPS Status | Description |
|---|---|
| **UPS in Abnormal Condition** AND **UPS Returned from Abnormal Condition** | An internal abnormal fault occurred within the UPS. Contact APC **Technical Support** when you get this status.<br>The second status indicates a return from the abnormal fault |
| **Alarm Test** | Selecting **Test UPS Alarm** from the **Diagnostics menu** displays this status indicator. |
| **Battery Discharged** | The UPS is on-line but its battery capacity is too low to support connected equipment.<br>Could be caused by a run-time calibration (which always results in a deep discharge of UPS battery power) or by an extended power failure during which the UPS operated on battery power. |
| **Bypass: User-Initiated** OR **Byp Maintenance** (character-based platforms) | The user put the Symmetra *Power Array* or Matrix-UPS or Symmetra *Power Array* into bypass mode to conduct maintenance.<br>In Bypass mode, the Symmetra *Power Array* or Matrix-UPS or Symmetra act only as voltage conditioners. The connected equipment is not protected from power anomalies such as blackouts, brownouts, and surges. |

| UPS Status | Description |
|---|---|
| **Bypass: UPS Failure** OR **Byp Mod Failure** (character-based platforms) | Your UPS is on bypass:<br>• For a Symmetra *Power Array*, the cause may be an overheated battery or an overload condition.<br>• For a Matrix-UPS, the cause is a malfunction within either the Electronics Unit or the Isolation Unit. Possible malfunctions include a blocked fan, a battery charger fault, high temperature, or a welded main relay. |
| **UPS Power Supply Failure** OR **Byp Supply Failure** (character-based platforms) | Your Matrix-UPS or Symmetra auxiliary power supply failed.<br>Contact APC **Technical Support**. If you attempt to put the UPS in bypass mode while the UPS has a failed auxiliary power supply, you lose all power to supported equipment. |
| **Calibrating** | The UPS is executing a run-time calibration. |
| **Low Battery** | The UPS is running on battery power, plus the UPS run-time remaining has reached the **UPS Low Battery Signal Time**. As a result, a low battery shutdown is about to begin. |
| **No Comm** | There is no communication between the UPS Monitoring Module and the UPS.<br>Ensure that the interface cable is securely connected and that the COM port selected through PowerChute *plus* is enabled and actually matches the COM port connected to the cable. |
| **No Server** | The User Interface Module has lost or failed to establish contact with the UPS Monitoring Module running on the selected host computer.<br>This status indicator may mean that the host computer is not currently running. |
| **On Line** | The UPS is running on utility power, AC. |
| **On Battery** | The UPS is providing battery power to connected equipment, DC. |
| **Replace Battery** | A UPS battery needs to be replaced: replace the defective battery.<br>Otherwise, contact APC **Technical Support**. |
| **Resetting Port** | You have changed the COM port and the system is registering this.<br>You can select COM ports by using the **Communication Parameters...** menu option on the **Configuration** menu. |
| **Self Test** | The UPS is undergoing a user-initiated or scheduled self-test.<br>For more information, please see **Initiate UPS Self Test** and **Schedule UPS Tests... in Chapter 7**. |
| **SmartBoost** | The Smart-UPS brownout correction feature, SmartBoost®, is ON.<br>SmartBoost corrects for low utility line voltage without switching the UPS to battery power. |

| UPS Status | Description |
|---|---|
| **UPS Overloaded** | For a Symmetra *Power Array*, the equipment load exceeds the total load capacity of the UPS modules installed. If you have configured the Symmetra *Power Array* with a redundancy requirement for fault tolerance, the current load capacity does not include the redundant UPS modules that provide that fault tolerance. Increase the number of non-redundant UPS modules by adding one or more UPS modules, or reduce the redundancy requirement. You display the currently configured redundancy requirement as described in Fault Tolerance section in Chapter 4. Your Symmetra *Power Array* user's manual explains how to configure the redundancy requirement |
| | For a Matrix-UPS, Symmetra *Power Array*, or Smart-UPS, the equipment load on the UPS exceeds its load capacity. |
| | Reduce the load by unplugging some equipment from the UPS, and perform a UPS self-test, using the **Initiate UPS Self Test** option in the **Diagnostics** menu. If the UPS still indicates overload, contact APC **Technical Support**. |

# Self-Test and Battery Information Window

```
Last UPS Self Test:  Passed
    Last Test Date:  04/04/94
    Bad Batt Packs:  00 of 10
```
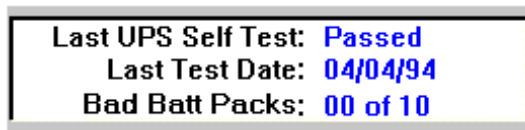
Located immediately below the Hardware and Status window on the Main Screen, the **Self-Test and Battery Information Window** displays information about the last UPS self-test and about the state of UPS battery packs if your UPS is a Matrix model or a Symmetra *Power Array.*

| Label | Description | Remedy |
|---|---|---|
| **Last UPS Self Test:** | The result of the last self-test. The possible options are: | - |
| | **Passed**<br>UPS passed its most recent self-test. | **-** |
| | **Failed**<br>UPS failed its most recent self-test. | Charge the battery for eight hours and redo the self-test. If it fails again and your UPS has a user-replaceable battery, see the UPS User's Manual for information on battery replacement. |
| | **Invalid Test**<br>The state of the UPS prevented a valid test from being performed. | Attempt to perform the test again. If the condition persists, contact APC **Technical Support**. |
| | **Unknown**<br>When you first install PowerChute *plus*, the status is Unknown until the first self-test is performed.<br>PowerChute *plus* saves self-test information, even when you stop and start PowerChute *plus.* However, if you uninstall and reinstall PowerChute *plus*, the self-test status is again Unknown. | Do a self-test. |
| **Last Test Date:** | The date of the last user-initiated UPS self-test. | - |
| **Bad Batt Packs:** | (Symmetra or Matrix-UPS and Symmetra *Power Array*) The number of depleted battery packs and the total number of battery packs. For example:<br>`Bad Batt Packs: 00 of 10`<br>In the preceding example, none of the ten battery packs is depleted, i. e. bad. If any packs are depleted, the background display is red; if they're okay, the background is white. | If the number of depleted battery packs is greater than zero, check the battery indicator lights to identify the bad battery packs, and replace them. (Call APC **Technical Support** to obtain replacements.) |

| | | |
|---|---|---|
| **Bad UPS Modules:** | (Symmetra *Power Array* only) The number of failed UPS modules and the total number of UPS modules. For example:<br><br>`Bad UPS Modules: 00 of 03`<br><br>In the preceding example, none of the 3 UPS Modules has failed (i. e. "are bad"), and PowerChute *plus* therefore displays the information with a white background. If one or more UPS Modules have failed, the background is red. | If the number of failed UPS Modules is greater than zero, check the indicator lights to determine which UPS Module has failed, and replace it. (Call APC **Technical Support** to obtain replacements.) |

# Data Fields Window

```
UPS Output: 117.6 VAC
Line Minimum: 113.7 VAC
Line Maximum: 119.6 VAC
UPS Temp: 96.8 °F
Output Freq: 60.00 Hz
Ambient Temp: 85.24 °F
Humidity: 15.1%
```

Situated below the Self-Test and Battery Information window on the Main Screen, the Data Fields Window displays various voltages, temperatures, and output frequencies. If you have a Measure-UPS environmental measuring accessory, the Data Fields window also displays ambient temperature and humidity, the last two fields shown in the example above.

By default, PowerChute *plus* polls, i.e. reads, all these values at 4-second intervals. For information on resetting the polling interval, see **[UPS] in Appendix C**.
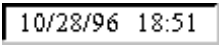
The Data Fields window displays the following fields:

| Label | Description |
|---|---|
| **UPS Output:** | The voltage supplied by the UPS to the attached equipment. |
| **Line Minimum:** | The lowest utility line voltage recorded during the last polling interval. |
| **Line Maximum:** | The highest utility line voltage recorded during the last polling interval. |
| **UPS Temp:** | The internal temperature of the UPS.<br><br>• Typical temperature with a charged battery is approximately 40°C/ 104°F.<br>• When the battery is charging heavily, the temperature can be as high as 50°C/ 122°F.<br>• At the end of a heavy load discharge, the temperature can be as high as 65°C/ 149°F.<br>• A temperature over 75°C/ 167°F indicates a failed fan, blocked ventilation, or other malfunction.<br><br>To configure temperature at Celsius or Fahrenheit, see **Monitoring Preferences... in Chapter 3**. |

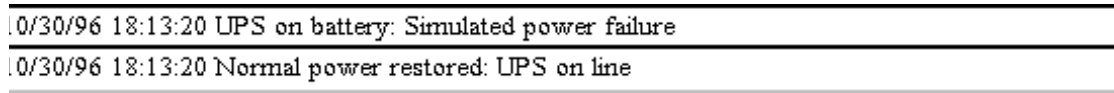| | |
|---|---|
| **Output Frequency:** | The frequency of the UPS output voltage in Hertz, to the nearest .25 Hz. |
| **Ambient Temp:** | The temperature, measured by the Measure-UPS device. |
| **Humidity:** | The humidity, measured by the Measure-UPS device. |

## Host Computer Date and Time Window

```
10/28/96  18:51
```

The Host Computer Date and Time window on the Main Screen, located immediately above the Last Two Events window, displays the date and the time setting of the host computer you are monitoring.

## Last Two Events Window

```
0/30/96 18:13:20 UPS on battery: Simulated power failure
0/30/96 18:13:20 Normal power restored: UPS on line
```

The **Last Two Events** window, at the bottom of the PowerChute *plus* Main Screen, displays the last two events, in the order they occurred, as recorded in the PowerChute *plus* Event Log.
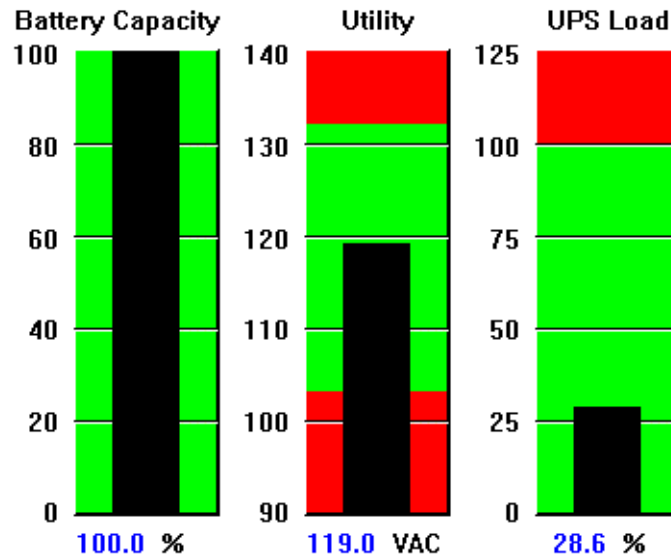
*Note:*
*Double clicking anywhere on this window opens the Event Log; this can also be done by selecting the Open Event Log... option from the Logging menu.*

# Bar Graph Area

The PowerChute *plus* Main Screen displays three bar graphs (when using smart signalling only). The middle and the right bar graph always display **Utility** voltage and **UPS Load** data respectively. By default, the left bar graph on the Main Screen displays **Battery Capacity** data, but you can configure it to display Battery Voltage or Run Time Remaining.

See **Monitoring Preferences... in Chapter 3** for more information on changing the bar graph display.

The following example of the bar graph area shows the default bar graphs.



The default three bar graphs are explained in the table below:

| Bar Graph | Description |
|---|---|
| **Battery Capacity** | The percentage of battery capacity remaining.<br><br>Note that to perform run-time calibration, battery capacity must be at 100%. |
| **Utility** | The utility line voltage, i.e. the AC voltage entering the UPS from an electrical outlet.<br><br>The bottom of the upper red area, the High Transfer Point, shows the highest line voltage the UPS will accept without switching to battery power or, with second and third generation Smart-UPS models, without activating the SmartTrim correction feature to cut back voltage.<br><br>The top of the lower red area, the Low Transfer Point, shows the lowest line voltage the UPS will accept without switching to battery power or, with second and third generation Smart-UPS models, without activating the SmartBoost brownout correction feature to add voltage.<br><br>See **High and Low Transfer Points in Chapter 3** for information on configuring the High and Low Transfer Points. |

| | |
|---|---|
| **UPS Load** | The load currently being supported by the UPS, as a percentage of total load capacity or, on a Symmetra *Power Array*, as a percentage of the total load capacity of the UPS modules installed. (If you have configured the Symmetra *Power Array* with a redundancy requirement for fault tolerant, the current load capacity does not include the redundant UPS modules that provide that fault tolerance.) |

The two display alternatives to the Battery Capacity bar graph are:
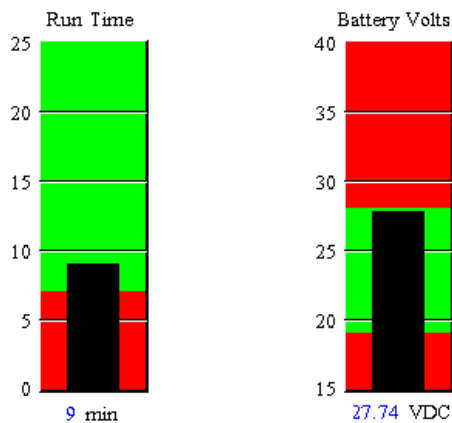


| Bar Graph | Description |
|---|---|
| **Run Time** | The number of minutes the UPS can support the current load when running on battery. The red area is the **UPS Low Battery Signal Time** which can be configured by the user. |
| **Battery Volts** | The UPS battery voltage (VDC). If the bar drops into the lower red zone, the UPS has either a weak battery or a malfunctioning battery charger. If the bar rises into the upper red zone, the UPS has a malfunctioning battery charger. |

# Screen Navigation in PowerChute *plus*

Use the keystrokes described in the following table to navigate the PowerChute *plus* Main Screen, including the menus and dialog boxes accessible from it, without using a mouse.

| Action | Keystrokes |
|---|---|
| To display a menu from the menubar | Simultaneously press the **Alt** key and the underlined letter of the name on the menubar: e.g. Alt+s for the System menu |
| To perform the action indicated by an item on a menu | Press the key indicated by the underlined letter of the menu item: e.g. u for Sh<u>u</u>tdown Server Now. |
| To move from field to field in a dialog box | Use the **Tab** key to move forward and Shift+Tab to move backwards |
| To select the **OK** button in a dialog box | Press the **Enter** key |
| To check or uncheck a check box | Press the **Spacebar** |

## Navigation in Character-based PowerChute *plus*

On character-based UNIX platforms, use the following keystrokes to move the cursor, select items, and perform operations in the menus, dialog boxes, and screens accessible from the PowerChute *plus* Main Screen.

| Key | Action |
|---|---|
| **Ctrl+g** | Select pull-down menus |
| **Tab** | Move from field to field |
| **Arrow Keys** | Move within a field |
| **Enter** | Select the **OK** button on the screen. |
| **Spacebar** | Activate the current radio button or field selection |
| **Ctrl+l** | Refresh the screen |

## Radio Buttons and Check Boxes in UNIX

**Radio buttons** are a group of screen buttons within which only one button can be chosen at a time. That is, when you select one button, all the others are automatically deselected. The Pulse and Tone buttons in **Communication Parameters...** form a radio button group.

**Check boxes** on a screen can be chosen individually. That is, each individual box can be toggled on or off, regardless of the state of other check boxes. The **Actions for Selected Events** boxes in **Event Actions...** are examples.

This standard "radio button" and "check box" terminology is used in this User's Guide even though the UNIX version of PowerChute *plus* has buttons and boxes that are slightly different looking from Windows equivalents. In UNIX, the buttons and boxes are *sunken* when selected, as distinct from a) having a dark circle for radio buttons and b) diagonal crosses for check boxes.

# Chapter 3: How to Configure PowerChute *plus*

The **Configuration** menu options on the Main Screen deal with configuring PowerChute *plus*. That is, these menu options tailor the PowerChute *plus* parameters to your own requirements.

You should examine these parameters immediately after you finish installing the software.

Selecting the **Configuration** menu from the Main Menu displays the following drop-down menu:



This chapter describes these options under the following headings:

- **UPS Operating Parameters...**

- **UPS Shutdown Parameters...**

- **Communication Parameters...**

- **Fault-Tolerance Data...**

- **Event Actions...**

- **Event Users...**

- **Measure-UPS Parameters...**

    *Note: This option is disabled if the Measure-UPS accessory is not attached.*

- **Monitoring Preferences...**

## UPS Operating Parameters...

The **UPS Operating Parameters..** option on the **Configuration** menu displays important parameters in the operation of the UPS and allows you to change some of them, for example, high and low transfer points and sensitivity.

The option is only available with a smart-signalling UPS.

*Note:*
*Values vary between UPS models and operating voltage; the values shown might not match those on your system.*

**UPS Operating Parameters**

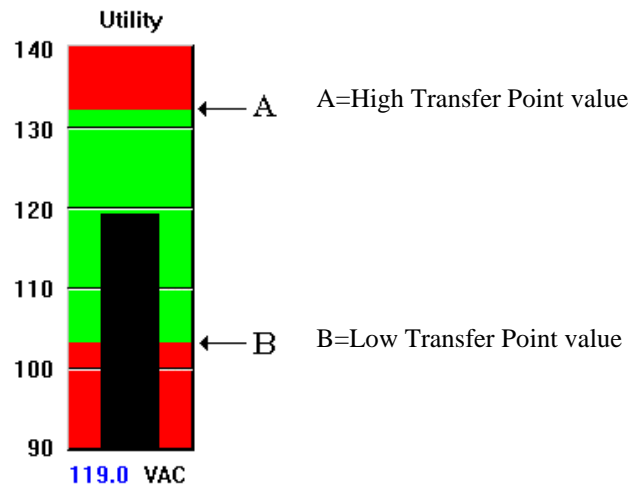| | |
|---|---|
| Firmware Revision: | 6QD |
| High Transfer Point | 132 VAC |
| Low Transfer Point | 103 VAC |
| Sensitivity | High |
| Nominal UPS Output | 115 VAC |
| UPS ID | Net UPS1 |
| Last Battery Replacement | 06/09/92 |
| UPS Serial Number: | 10000042 |
| UPS Manufacture Date: | 06/09/92 |

OK          Cancel

Some of the fields in the dialog box are display-only and some can be edited, as shown in the table below. Please click on the blue highlighted words in the table below for more details.

| Field | Type | Description |
|---|---|---|
| **Firmware Revision** | Read-only | Revision number for the firmware the UPS uses |
| **UPS Serial Number** | " | UPS serial number |
| **UPS Manufacture Date** | " | Date APC finished manufacturing your UPS |
| **High and Low Transfer Points** | Accepts Input | Acceptable input voltage range |
| **Sensitivity** | " | UPS tolerance for input voltage distortions |
| **Nominal UPS Output** | " | UPS output voltage when on battery |
| **UPS ID** | " | A name for your UPS. This assigns a unique name to your UPS. Use up to 8 alphanumeric characters. |
| **Last Battery Replacement** | " | Last date the battery was changed. When you change a UPS battery, enter the date here. |

## High and Low Transfer Points

These two point values, available through **UPS Operating Parameters...**, define the range of input voltage that a UPS will accept for on-line operation.



A=High Transfer Point value

B=Low Transfer Point value

| If input voltage... | ...then this happens |
|---|---|
| >= High Transfer Point value | The UPS does one of the following:<br><br>1. A Smart-UPS uses SmartTrim to decrease the input voltage to a level the UPS can use.<br>However, if the voltage goes to 24% or more above the High Transfer Point value, the UPS goes on battery.<br><br>2. All other UPS models switch to battery power |
| =< Low Transfer Point value | The UPS does one of the following:[a]<br><br>1. A Smart-UPS uses SmartBoost to increase the input voltage to a level the UPS can use.<br>However, if the voltage goes to 24% or more below the Low Transfer Point value, the UPS goes on battery.<br><br>2. All other UPS models switch to battery power. |

a. PowerChute plus generates a **UPS Enabling SmartBoost** event when a UPS goes on Smartboost, and a **UPS On Battery** event when a UPS switches to battery power.

If your equipment can tolerate a **wide voltage range**, you may want to change the point values to increase the voltage range your UPS accepts for on-line operation: by increasing the High and by decreasing the Low Transfer Points.

A wider voltage range helps conserve the UPS battery by reducing the number of times the UPS goes on battery. This is especially true in:

- locations that experience frequent peaks and dips in the input voltage levels
- locations with chronically high or low input line voltage

*Note: You can't change the Low Transfer Point for Matrix-UPS or Symmetra Power Array: they use an Automatic Voltage Regulator.*

See **Sensitivity** for information about how to further decrease the number of times your UPS goes on battery.

## Sensitivity

The **Sensitivity** parameter, available through **UPS Operating Parameters...**, defines how your UPS tolerates input voltage distortions, e.g., "noise". Noise here is defined as electromagnetic interference and radio interference.

At `High`, the default, the UPS switches to battery more often than for the `Medium` and `Low`. For Matrix-UPS or Symmetra *Power Array* models, you can also select `Auto Sensitivity`.

If your UPS frequently switches to battery, try changing the **Sensitivity** value:

1. Make sure the UPS-supported equipment has no open applications.

2. Change the **Sensitivity** value to `Medium` or `Low`.

3. Test the new setting by removing the input power from the UPS.

   *Note:*
   *If your system does not reboot, the new setting is okay. If the system reboots, reset* **Sensitivity** *to* `High`*, because this indicates your equipment cannot tolerate the greater input line distortion.*

See also **High and Low Transfer Points** for additional information on how to control the number of times your UPS goes on battery.

## Nominal UPS Output

This parameter, available through **UPS Operating Parameters...**, defines the output voltage supplied by the UPS on battery.

A 120 VAC UPS uses a fixed, `115` volt value. All other UPS models allow you to select the value from a model-specific set of values.

For best results, set it to a value that matches, or comes close to matching, the typical AC utility input voltage so that no major voltage change occurs when the UPS switches to battery.

For a Matrix-UPS, you can set up the UPS to use a different input voltage through an actual setting on the hardware. For example, you can change the UPS to use 208V instead of 240V. If you do change a Matrix-UPS to use a different input voltage, make sure you change the **Nominal UPS Output Voltage** value to a value which matches the new setup:

- For 240V, you can use `220`, `230`, or `240` for the output voltage.

- For 208V, use `208` for the output voltage.

## UPS Shutdown Parameters...

The **UPS Shutdown Parameters...** option on the **Configuration** menu defines how a UPS reacts when utility power fails and also when utility power returns after a power failure.

The menu option is only available with smart-signalling, not with simple-signalling.

*Note:*
*The values shown for UPS Wakeup Delay (Capacity) in the sample dialog box are for a Smart-UPS 700 model.*



The fields are described in the table below; please click the blue highlighted words for more details on some of the fields.

| Field | Description |
|---|---|
| **UPS Low Battery Signal Time** | Determines when to generate a **Low Battery Condition** event and a **UPS Battery is Discharged** event. |
| **UPS Turn Off Delay** | Determines how long a UPS waits, in seconds, from the time PowerChute *plus* commences the system shutdown to the time the UPS actually goes into sleep mode. Shutting down here means turning off the power to the supported equipment. <br><br> Make this value large enough to allow for the complete shutdown of the operating system. |
| **UPS Wakeup Delays: Time and Capacity** | These combine to define when a UPS turns on after a power failure and to ensure that, if there is a power failure immediately on rebooting, the UPS has enough battery capacity to handle it. |
| **UPS Audible Warning** | When to sound the warning beep. |
| **Automatic Reboot** | Checked, this means the UPS automatically reboots after a shutdown—once the power is restored and the UPS is back on-line. <br><br> Unchecking it prevents a UPS from turning its supported equipment on and off repeatedly in extraordinary situations like an earthquake or in geographic areas where frequent power outages occur. |

## UPS Low Battery Signal Time

This setting, in **UPS Shutdown Parameters...**, specifies a time in minutes, telling PowerChute *plus* when to create two events, as explained in the table below:

| When UPS is.. | UPS Low Battery Signal Time specifies timing of.. | Example |
|---|---|---|
| ...supplying battery power | ...**Low Battery Condition** event | With a value of 10, it generates this event when the battery has 10 minutes charge remaining.<br><br>Note that PowerChute *plus* always initiates a shutdown after a Low Battery Condition event. |
| ...on-line, relaying AC power | ...**UPS Battery Is Discharged** event | With a value of 7 and the UPS on-line, it generates this event with 7 minutes of battery time remaining.<br><br>Because the UPS is not on battery, there is no need to shutdown the system though you could set it to do so (see **Event Actions...**) |

The **Run Time** bar graph example below shows a red bar indicating a current Low Battery Signal Time value of 7 minutes.



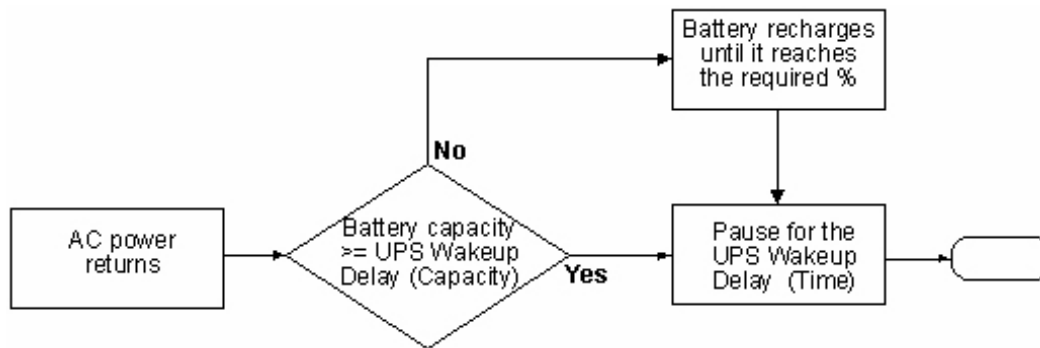A=UPS Low Battery Signal Time
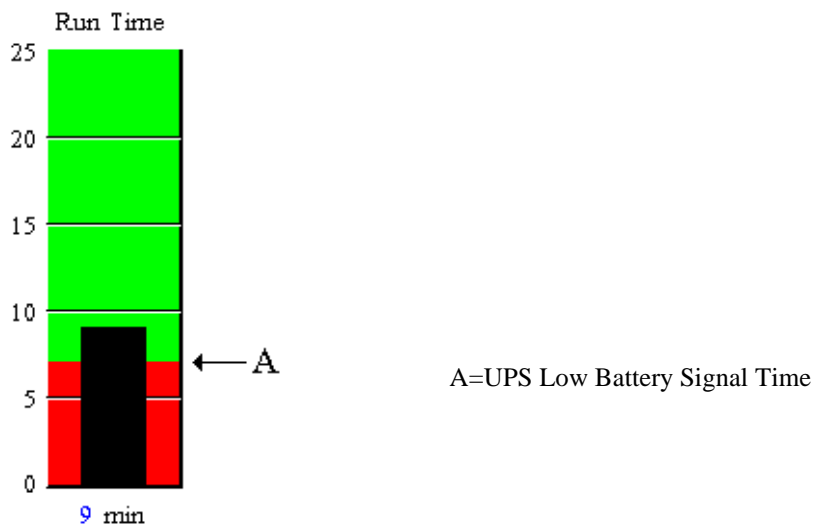
*Note:*
*By default, the main screen does not display the **Run Time** bar graph. See **Monitoring Preferences...**.*

## UPS Wakeup Delays: Time and Capacity

The values in these two fields, available through **UPS Shutdown Parameters...**, combine to define when a UPS turns on after a power failure. (This assumes **Automatic Reboot** is enabled; if disabled, these field values are irrelevant).

- The **UPS Wakeup Delay (Time)** allows you to delay turning on your UPS for a specified number of seconds. For example, if you need other equipment running before your UPS goes back on line, use this setting to delay the UPS resumption.

- The **UPS Wakeup Delay (Capacity)** value specifies what percentage of the total UPS battery capacity your UPS must have before it goes back on-line. Use this value to make sure the UPS has enough battery capacity to supply power to its supported equipment if another power failure occurs.

The flowchart below shows the sequence of events that refer to these values when power returns:



*Note:*

*With a Matrix-UPS or Symmetra Power Array, the **UPS Wakeup Delay (Capacity)** field is disabled. To make sure a Matrix-UPS or Symmetra can support its equipment if a power failure occurs, increase the **UPS Low Battery Signal Time** value to reserve sufficient battery capacity when the UPS shuts down.*

## UPS Audible Warning

Use this value, in **UPS Shutdown Parameters...**, to define when you want the UPS to use an audible alarm in response to power problems.

If power interruptions occur frequently, you can use the following possible values to reduce the number of alarm sounded or to disable the alarms:

| Possible Value | Function |
|---|---|
| **Power Fail** | The UPS beeps when a power failure occurs, and periodically thereafter while on battery. |
| **Power Fail + 30** | The UPS beeps only when a power failure lasts for 30 seconds or longer, and periodically thereafter while on battery. |
| **At Low Battery** | The UPS beeps only when a **Low Battery Condition** occurs (the default). |
| **Never Beep** | The UPS never beeps. |

## Communication Parameters...

The **Communication Parameters...**
option on the **Configuration**
menu enables you to configure
communication and paging details.

See the following sub-sections for
information about how to use the two
areas in the dialog box:

- **UPS Communications Options**

- **Paging Modem Options**

### UPS Communications Options

The communications options are viewable through **Communication Parameters...**. If you indicated the correct UPS model during installation, the **Simple Signalling** or **Smart Signalling** radio button is already set by default. There should not be any need to change this value, ordinarily.

| Signalling Type | UPS Types |
|---|---|
| Simple | Back-UPS |
| Smart | Smart-UPS, a Matrix-UPS, or a Symmetra *Power Array* |

In the **Communications Port** drop-down list box, select the serial port that connects the UPS to your computer.

### Paging Modem Options

If you have a paging modem, PowerChute *plus* can use the modem to notify users about certain events. Configure these **Communication Parameters...** dialog box fields to affect how the paging modem operates:

1. Select the **Pulse** or **Tone** radio button depending on what type of dialing you use.

2. Select the communications port to which the modem connects.

3. When not using a Hayes-compatible modem, enter in the **Initialization** box the initialization string used by your modem. Refer to your modem manual for information on initialization strings and Hayes-compatibility.

4. Choose your modem's **Baud Rate** from the options: 300, 1200, 2400, 9600, 14400, and 19200.

For information on further setup steps in paging users, see **How to Page Users in Chapter 4**.

# Fault-Tolerance Data...

The **Configuration** menu's **Fault-Tolerance Data** menu option opens the "Fault-Tolerance Data" dialog box. This dialog box provides information on the fault tolerance level, capacity, and alarm settings of your Symmetra *Power Array*, and on the hardware components that provide the fault tolerance.

*Note:*
*PowerChute  disables the* **Fault-Tolerant Data** *menu option for all UPS models except a Symmetra Power Array.*
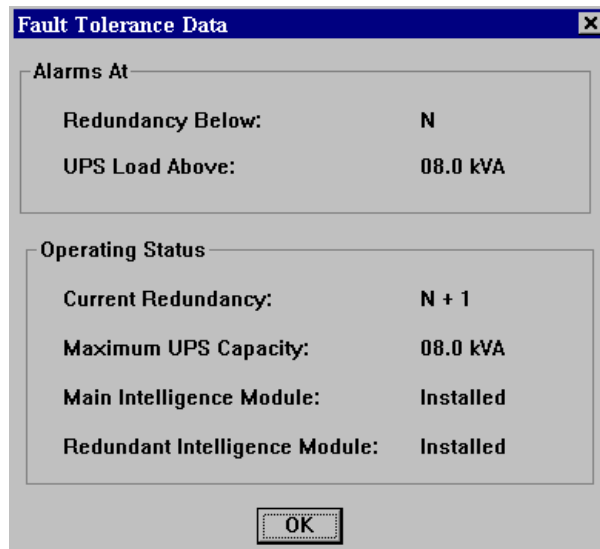


The **Alarms At** section of the "Fault Tolerance Data: dialog box displays the following Symmetra *Power Array* alarm settings. See your *Symmetra Power Array User's Guide* for information about how to define these settings.

|  |  |
|---|---|
| **Redundancy Below:** | If the Symmetra *Power Array* redundancy falls below this value, an alarm condition occurs. The **Redundancy Below:** value defines the number of functioning UPS modules the Symmetra *Power Array* must have in excess of the number of UPS modules needed to support the Symmetra *Power Array* equipment load. For example, a **Redundancy Below:** value of N+1 means that the Symmetra *Power Array* must have at least one more functioning UPS module than needed to support the current load. |
|  | If the number of functioning UPS modules falls below the support level specified by the **Redundancy Below:** value, PowerChute *plus* issues a **Minimum Redundancy Lost** event. The loss of minimum redundancy can occur when the number of UPS modules decreases due to the failure or removal of a UPS module or due to an increase in the equipment load which needs support. |
| **UPS Load Above:** | The maximum equipment load, in thousands of Volt-Amps, that the Symmetra *Power Array* can support. If the load increases above this value, an alarm condition occurs. |

The **Operating Status** section of the "Fault Tolerance Data" dialog box displays the following information about the Symmetra *Power Array*.

**Current Redundancy:**      Identifies how many functioning UPS Modules the Symmetra *Power Array* has in excess of the number of modules needed to support the current equipment load. For example, a **Current Redundancy:** value of N+2 means that the Symmetra *Power Array* has two more functioning UPS Modules than needed.

**Maximum UPS Capacity:**      The Maximum load, in thousands of Volt-Amps (kVA), that the Symmetra *Power Array* can currently support. For example, a Symmetra *Power Array* with four functioning UPS Modules, and which has no redundancy requirement (fault-tolerance level = N), has a current maximum load capability of 16 kVA (16,000 Volt-Amps). If you change the redundancy needed by this Symmetra *Power Array* to N+1, the maximum load capability will change to 12 kVA (12,000 VA).

**Main Intelligence Module:**      This field reports `Installed` or `Not Installed`. The `Not Installed` value appears when the Main Intelligence Module fails or when you remove it, but only if the Symmetra *Power Array* has a functioning Redundant Intelligence Module to report the `Not Installed` value. If both Intelligence Modules fail, PowerChute *plus* issues a **Lost Communication With UPS** event.

**Redundant Intelligence Module:**      This field reports `Installed` or `Not Installed`. The `Not Installed` value appears when the Redundant Intelligence Module fails or when you remove it, but only if the Symmetra *Power Array* has a functioning Main Intelligence Module to report the `Not Installed` value. If both Intelligence Modules fail, PowerChute *plus* issues a **Lost Communication With UPS** event.
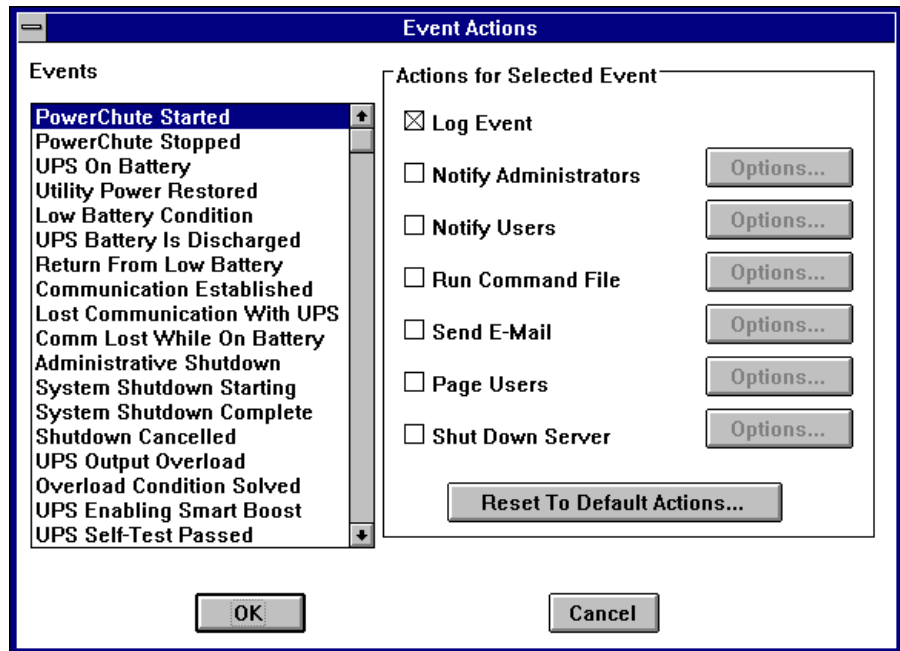
## Event Actions...

The **Event Actions...** option on the **Configuration** menu defines how PowerChute *plus* responds to events, known as FlexEvents, related to the UPS.

This also applies to a Measure-UPS, if this device is connected to the UPS.

*Note:*
*When the UPS uses simple-signalling (for example, a Back-UPS), PowerChute plus provides only a small number of FlexEvents.*

**Event Actions**

Events

PowerChute Started
PowerChute Stopped
UPS On Battery
Utility Power Restored
Low Battery Condition
UPS Battery Is Discharged
Return From Low Battery
Communication Established
Lost Communication With UPS
Comm Lost While On Battery
Administrative Shutdown
System Shutdown Starting
System Shutdown Complete
Shutdown Cancelled
UPS Output Overload
Overload Condition Solved
UPS Enabling Smart Boost
UPS Self-Test Passed

Actions for Selected Event

☒ Log Event

☐ Notify Administrators        Options...

☐ Notify Users        Options...

☐ Run Command File        Options...

☐ Send E-Mail        Options...

☐ Page Users        Options...

☐ Shut Down Server        Options...

Reset To Default Actions...

OK        Cancel

Other parts of this User's Guide deal with this dialog box in detail:

- For more information on using this dialog box to configure FlexEvents, see **Chapter 4, How to Configure FlexEvents**

- For a list of all FlexEvents, listed under Events in the dialog box, and a brief description of each, see **Appendix A, FlexEvents Reference**.

## Event Users...

The **Event Users...** option on the **Configuration** menu specifies whom you want to notify when certain FlexEvents occur and how you want to notify them.

The dialog box has a list of users already added through this dialog in the upper left corner.

```
┌─────────────────────────────────────────────────────────────┐
│ ▬                      Event  Users                          │
│                                                              │
│  ┌──────────────────────────┐   ┌──────────────────────────┐ │
│  │ Don                      │   │ Don                      │ │
│  │ Doug                     │   └──────────────────────────┘ │
│  │ Pete                     │   [ Add ] [ Rename ] [ Delete ]│
│  │                          │                               │
│  └──────────────────────────┘                               │
│                                                              │
│  ┌─Messaging──────────────────────────────────────────────┐ │
│  │   ⊠ Enabled                                             │ │
│  │   Notification Address │ don.sales.myc              │   │ │
│  └────────────────────────────────────────────────────────┘ │
│                                                              │
│  ┌─Paging─────────────────────────────────────────────────┐ │
│  │   ⊠ Enabled                         Pager Service       │ │
│  │     Access Number │ 555-2222 │     │ Skytel        ±│   │ │
│  │     Access Code   │ 4444     │      [ Edit Services... ] │ │
│  └────────────────────────────────────────────────────────┘ │
│                                                              │
│  ┌─E-Mail─────────────────────────────────────────────────┐ │
│  │   ⊠ Enabled                                             │ │
│  │     E-Mail Address │ don@apc.uri.edu │                 │ │
│  └────────────────────────────────────────────────────────┘ │
│                                                              │
│              [   OK   ]        [  Cancel  ]                  │
└─────────────────────────────────────────────────────────────┘
```

This usage of FlexEvents and notification of users is discussed in greater detail in other parts of this User's Guide:

- For full background on FlexEvents, see
  **Chapter 4, How to Configure FlexEvents**

- For more specific information on this dialog box, see
  **How to Set Up Event Users in Chapter 4**.

## Measure-UPS Parameters...

The **Measure-UPS Parameters...** option on the **Configuration** menu configures UPS accessories — Measure-UPS or SmartSlot Measure-UPS II — to monitor and report ambient temperature, relative humidity, and the state of external contact closures.

*Note:*
*If you do not connect either accessory to your UPS, PowerChute plus disables this option. These accessories can be used with a Symmetra Power Array, Smart-UPS, Symmetra, or Matrix-UPS.*

The fields split into three main sets with the latter two described in two sub-sections in blue highlight below. The table following shows where to find other information.

- **Firmware Revision** identifies the firmware version embedded in the Measures-UPS.

- **Thresholds**

- **Contacts**

| For Information on... | ...See |
|---|---|
| The Measure-UPS | **Appendix B, Measure-UPS and its Events** |
| The events generated by the Contacts area | **Events relating to the Measure-UPS** |
| FlexEvents | **Appendix A, FlexEvents Reference** |

## Thresholds

This area of the **Measure-UPS Parameters...** dialog box sets the ambient temperature and humidity high and low values. Setting this range ensures that the environment temperature and humidity are within acceptable limits.

To change an enabled threshold value, type the new value into the threshold's data field. See your Measure-UPS or SmartSlot Measure-UPS II user's manual for the temperature and humidity ranges that your device can measure.

The following table identifies the default threshold values:

| Low Temperature | 68.00° Fahrenheit |
|---|---|
| High Temperature | 176.00° Fahrenheit |
| Low Humidity | 20.00% Relative Humidity |
| High Humidity | 80.00% Relative Humidity |

You enable a disabled threshold by clicking over the threshold's blank check box.

*Note:*
*Fahrenheit is always used in this dialog box, regardless of the value chosen in Monitoring Preferences....*
*To convert between the two temperature types, celsius/centigrage and fahrenheit, use the following formulae:*

| Celsius to Fahrenheit | Fahrenheit |
|---|---|
| F=(9/5)C + 32 | C=5/9(F-32) |

## Contacts

Each Measure-UPS device has four sets of sensor zones, also known as contact closures, shown in the figure following.
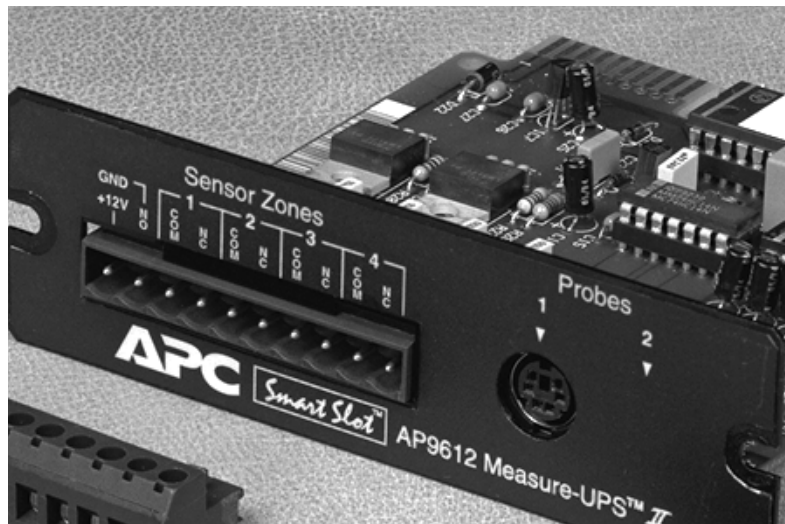


The **Contacts** area of of the Measure-UPS Parameters dialog box defines the normal condition for each closure, Open or Closed.

1. To redefine the position to use as the normal state, select Open or Closed in the **Normal State** drop-down list box of the **Measure-UPS Parameters...** dialog.

2. You can also input a description value for each contact closure. This is then included in the text of any notification messages or Data Log entries.

   For example, if you attach a contact to the door of a remote data center and name the contact as Contact 1 and its state as normally closed, PowerChute *plus* generates an **Abnormal Contact Position** event when anyone opens that door. When the door closes again, PowerChute *plus* generates a **Contact Normal** event.

## Monitoring Preferences...

The **Monitoring Preferences...** option on the **Configuration** menu is only available when using smart-signalling, not simple-signalling.
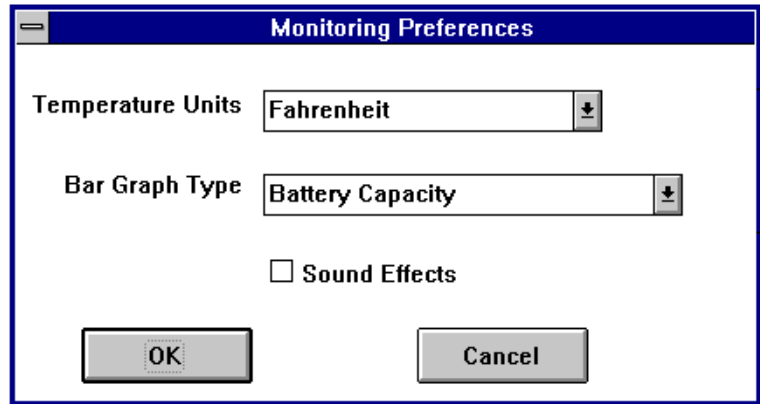
The following table describes the options:

| Field | Description |
|-------|-------------|
| **Temperature Units** | When you select a new temperature units value (Celsius or Fahrenheit), the temperature measurement displayed on the Main Screen changes to reflect that selection |
| **Bar Graph Type** | Changes the left-hand bar graph display on the Main Screen. |
| **Sound Effects** | With **Sound Effects** enabled (checked), PowerChute *plus* beeps when it polls the UPS Monitoring Module for UPS and Measure-UPS data every four seconds. |

## Bar Graph Type

By default, the main screen uses the bar graphs in the figure to display the data for a Smart-UPS, Matrix-UPS, or Symmetra *Power Array*:

You can use the following additional **Bar Graph Type** values to change the data displayed by the left-hand graph, which defaults to Battery Capacity:

- Run Time Remaining
- Battery Voltage

For more details on what the bar graphs actually mean, see **Bar Graph Area in Chapter 2**.

*Note:*
*None of these bar graph types are available for Back-UPS.*
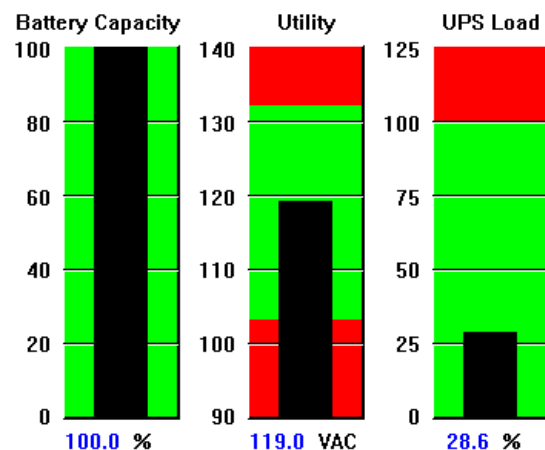
# Chapter 4: How to Configure FlexEvents

The topics in this chapter define FlexEvents and describe how to configure them to respond to information:

**What are FlexEvents?**    Explains the different aspects and usages of FlexEvents

**How to Configure Actions**    Deals with configuring FlexEvent actions through the **Event Actions** option on the Configuration menu.

**How to Set Up Event Users**    Deals with specifying users to be informed of events through the **Event Users** option on the Configuration menu.

# What are FlexEvents?

FlexEvents have two aspects: events and actions.

- **Events** are occurrences related to your American Power Conversion UPS system. They range in severity from informational events like **PowerChute Started** to critical events like **UPS on Battery**.

   See **Appendix A, FlexEvents Reference** for descriptions of the events generated by PowerChute *plus.*

- **Actions** are responses by PowerChute *plus* to these events and can be configured to suit your requirements. They can range from notifying users to shutting down the system

   See **How to Configure Actions.**

Together, these two aspects of FlexEvents give you the power to configure PowerChute *plus* to react to certain events by automatically triggering actions.

You can trigger any of the following actions for most events:

**Possible Actions**

Log an event in the PowerChute *plus* Event Log

Notify administrators and other users

Run command files

Page users

Send e-mail to users

Shut down the system

# How to Configure Actions

The following sections describe how to use the **Event Actions** dialog box to define the actions PowerChute *plus* takes in response to a FlexEvent:

- **Basics of the Event Actions Dialog Box**

- **Overview of Possible Actions for Events**

- **How to Notify Administrators**

- **How to Notify Users**

- **How to Run a Command File**

- **How to Send E-Mail**

- **How to Page Users**

- **How to Shut Down a Server**
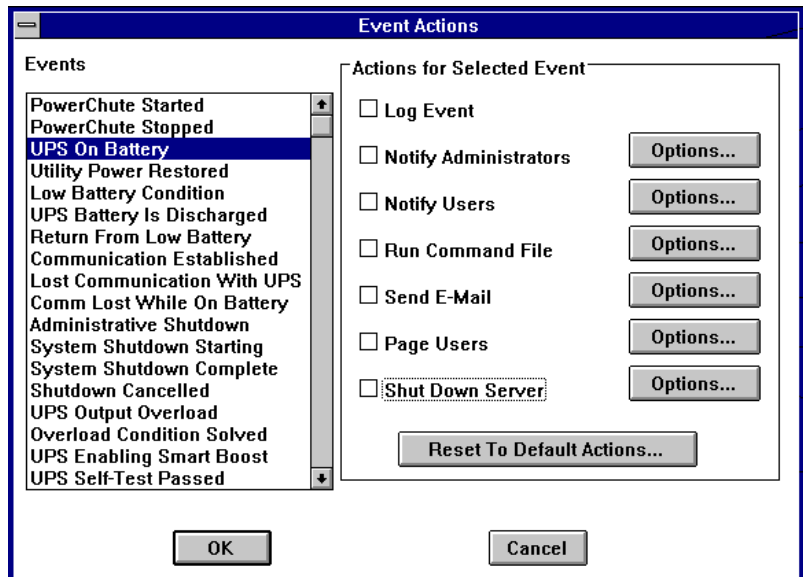
## Basics of the Event Actions Dialog Box

The **Configuration** menu's **Event Actions...** option allows you to configure how PowerChute *plus* responds to UPS and Measure-UPS events. This dialog box has the following components:

| Use this Component... | ...to Perform this Action |
|---|---|
| **Events** | Select the event to configure. |
| **Actions for Selected Event** | Define what actions PowerChute *plus* performs when the selected event occurs. To define actions for an event, do the following: <br><br> 1. Disable or enable each enabled action you do and do not want to use, by clicking its check-box to uncheck it or check it respectively. <br><br> 2. For each enabled action, click **Options...**. <br><br> 3. Use the dialog box that appears to configure the action. <br><br> 4. Click **OK** to return to the Event Actions dialog box. |
| **Reset to Default Actions...** | Click the Reset To Default Actions button to open a dialog box that allows you reset actions to their default conditions. In that dialog: <br><br> • Click **This One**, to reset the selected event's actions. <br><br> • Click **All**, to reset the actions for all events. <br><br> • Click **Cancel** to exit the dialog box without resetting the actions for any event. <br><br> • *Note: Default actions for a Symmetra Power Array differ from the default actions for other UPS's. For a Symmetra Power Array, fewer FlexEvents have the Shut Down Server action enabled by default.* |

## Overview of Possible Actions for Events

The following table briefly describes what PowerChute *plus* will do for possible actions. These actions are discussed in **Event Actions... in Chapter 3**.

*Note:*
*When in doubt, use the default actions to see if those actions meet your needs.*

| For this Action... | ...PowerChute *plus* does this |
|---|---|
| **Log Event** | Logs the event in thePowerChute *plus* Event Log file.<br>See **Chapter 6, Logging Data** for information on the Event Log file. |
| **Notify Administrators** | Sends a broadcast message to the administrators listed in the Notify Administrators dialog box.<br>See **How to Notify Administrators**. |
| **Notify Users** | Sends broadcast messages to the users listed in the Notify Users dialog box. (The default is all users).<br>See **How to Notify Users**. |
| **Run Command File** | Runs an external executable command file specified in the Run Command File dialog box.<br>See **How to Run a Command File**. |
| **Send E-Mail** | Sends an e-mail message to the users listed in the Send E-Mail dialog box.<br>See **How to Send E-Mail**. |
| **Page Users** | Pages the users listed in the Page Users dialog box.<br>See **How to Page Users**. |
| **Shut Down Server** | Initiates a server shutdown when an event lasts longer than the delay time defined for **Shut Down Server** action.<br>See **How to Shut Down a Server**. |

## Notification of Administrators and Users

The **Notify Administrators** action discussed in **Event Actions... in Chapter 3** differs from the **Notify Users** action in the following ways:

| | Notify Administrators | Notify Users |
|---|---|---|
| **Notify Whom?** | Selected administrators | • Selected users<br>• All users |
| **How Many Times?** | Once | Once or repeatedly |

See also **How to Notify Administrators** and **How to Notify Users**.

## How to Notify Administrators

The **Notify Administrators** action enables PowerChute *plus* to send broadcast messages to selected administrators when a specific event occurs.

See also **Notification of Administrators and Users** and **Format of a Notification Message** for more information.

Use the following steps to configure the **Notify Administrators** action for an event.

1. From the Configuration menu, choose **Event Actions...**, and highlight the event from the Events list.

2. Click on the **Notify Administrators** action check-box to enable it, i.e., make it sunken.

3. Click the **Options...** button next to **Notify Administrators** to open its dialog box.

The event name displays along the top, UPS on Battery in the example figure.

Notifiable Users shows those users already created.



4. Configure which administrators to notify when the event occurs:
   - To specify an administrator to notify, highlight a user in Notifiable Users, and click **<<Add<<** .
   - To remove an administrator, highlight the name in Administrators To Notify, and click >>**Remove**>>.
   - Click the **Edit Users...** button to actually create new users. See **How to Set Up Event Users**.

5. To change the message, edit the **Notification Message** text.

   *Please see Usage of Text in Notification Messages*

6. Use the **Wait** field to define how long, by default 5 seconds, PowerChute *plus* waits before notifying administrators.

   *Note that PowerChute plus notifies administrators only when the event lasts for the defined **Wait** period. For example, for a setting of 10, administrators don't get informed if the event lasts less than 10 seconds.*

7. Click **OK** to save your changes and exit the dialog box.

## How to Notify Users

The **Notify Users** action enables PowerChute *plus* to send broadcast messages to selected users whenever a specific event occurs.
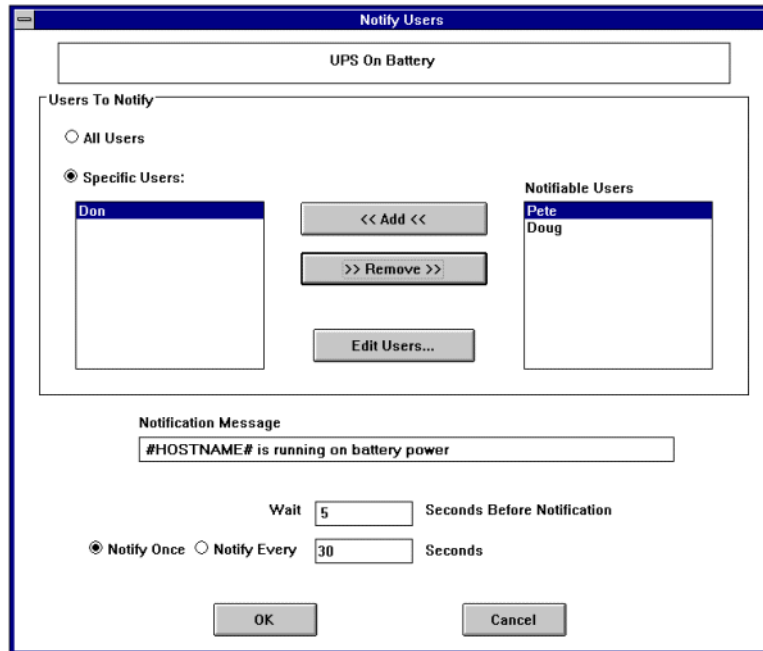
See also **Notification of Administrators and Users** and **Format of a Notification Message** for more information.

Use the following steps to configure an event's **Notify Users** action:

1. From the Configuration menu, choose **Event Actions...**, and highlight the event from the Events list.

2. Click on the **Notify Users** action check-box to enable it, i.e., make it sunken.

3. Click the **Options...** button next to **Notify Users** to open its dialog box:

The event name displays along the top, UPS on Battery in the example figure.

Notifiable Users shows those users already created.



4. Configure which users to notify when the event occurs:

   a. Select **All Users** to have PowerChute *plus* send the notification message to all network users.

   b. Select Specific Users to send the notification messages to individual users by doing the following:

      • To specify a user to notify, highlight a user in Notifiable Users, and click **<<Add<<** .

      • To remove a user, highlight the name in Specific Users, and click >>**Remove**>>.

      • Click the **Edit Users...** button to actually create new users. See **How to Set Up Event Users**.

5. To change the message, edit the **Notification Message** text.

   *Please see Usage of Text in Notification Messages*

6. Use the **Wait** field to define how long, by default 5 seconds, PowerChute *plus* waits before notifying users.

   *Note that PowerChute plus notifies users only when the event lasts for the defined **Wait** period. For example, for a setting of 10, users don't get informed if the event lasts less than 10 seconds.*

7. Select how often you want the message sent.

   - To send a message only once, select **Send Once**.

   - To send a message repeatedly while the event lasts, use the **Notify Every .... Seconds** field to define how often you want the message sent (default 30 seconds).

8.   Click **OK** to save your changes and exit the dialog box.

## Format of a Notification Message

A PowerChute *plus* event message, whether to an administrator or user, has two lines of text.

### Sample message

```
Message from PowerChute@NETCOMP1 to * on Wed Jan 5 22:39:02 2000
Salome has lost communication with the UPS
```

•   The top line identifies which system sent the message (NETCOMP1 in the example) and when the message was sent.

•   The second line, the message line, provides the event message. When the event includes the **Shut Down Server** action, also identifies how much time remains *before* PowerChute initiates a shutdown.

One event, **UPS On Battery**, always identifies how much time remains before a shutdown begins, as follows:

-   With **Shut Down Server** enabled (the default), it uses the shutdown delay specified there.
-   With **Shut Down Server** disabled, it uses the **Low Battery Condition** time setting.

UNIX platforms log all events in the **syslog** file. Depending on your system configuration, notification messages may be broadcast by PowerChute *plus*, and by **syslogd**. Messages broadcast by **syslogd** enclose the process ID in square brackets [ ].

### Usage of Text in Notification Messages

The [PopupText] section of the PowerChute *plus* initialization (INI) file defines the default notification message text for nine particular FlexEvents. You can edit the initialization file directly to change an event's message.

You can also use the Notify Administrators or Notify Users dialog box and change the **Notification Message** field. This will supersede anything in the INI file but please note that changes made to the Notification Message field *do not affect* the actual text in the [PopupText] or [EventText] sections of the PowerChute *plus* initialization file.

*Note:*
*See **[PopupText]** and **[EventText] in Appendix C** for more information about event messages. See also **How to Notify Administrators** and **How to Notify Users**.*

## How to Run a Command File

The **Run Command File** action — available through **Event Actions...** on the Configuration menu — enables PowerChute *plus* to run an external, executable file when an event occurs. For example, for an Administrative Shutdown event, you might want to stop a running process, or run a batch file or a script.

External command files execute with "root" permissions. Therefore, you need to protect these files. See your UNIX system's documentation on how to set file permissions.

Use the following steps to configure an event's **Run Command File** action.

1.  In the **Event Actions...** dialog box, highlight the event from the **Events** list.

2.  Click the check-box for the **Run Command File** action to enable it if necessary.

3.  Click **Options...** for the **Run Command File** action to open the Run Command File dialog box.
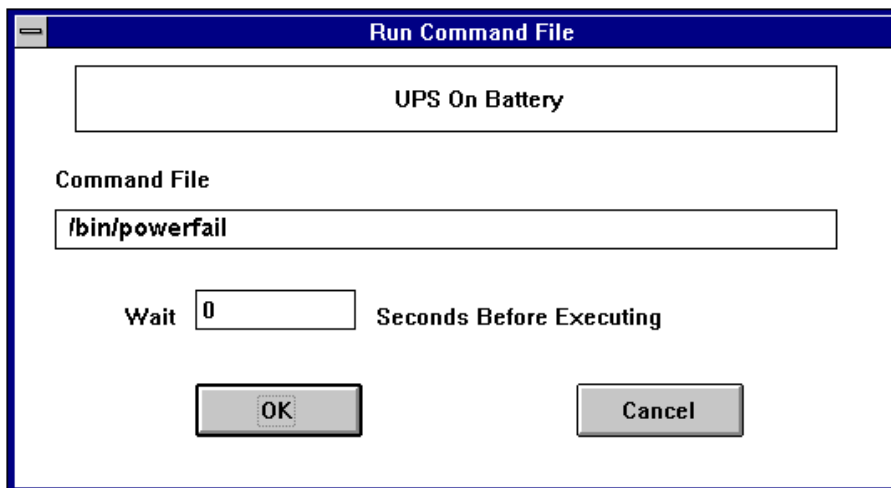


4.  In the **Command File** field, enter the complete path and name for the script you want to run when the event occurs.

    In the example figure, this shows that the **/bin/powerfail** script will run every time the **UPS On Battery** event occurs.

5.  Use the **Wait** field to define how long (by default, 0 seconds) PowerChute *plus* waits before executing the command file.

6.  Click **OK** to save your changes and exit the dialog box.

## How to Send E-Mail

The **Send E-Mail** action — available through **Event Actions...** on the Configuration menu — enables PowerChute *plus* to send an e-mail message to selected users when an event occurs.

Use the following steps to configure this:

1. In the **Event Actions...** dialog box, select the event from the **Events** list.

2. Click on the check-box for the **Send E-Mail** action to enable it, if necessary.

3. Click **Options...** for the **Send E-Mail** action to open the Send E-Mail dialog box.

The event name displays along the top, **UPS on Battery** in the example figure.

**E-Mail Users** shows those users already created and available.



4. Configure which users to send e-mail to when the event occurs:

   • To specify a user to notify, highlight a user in **E-Mail Users**, and click **<<Add<<** .

   • To remove a user, highlight the name in **Send E-Mail To**, and click >>**Remove**>>.

   • Click the **Edit Users...** button to actually create new users. See **How to Set Up Event Users**.

5. To change the message, edit the **Additional Mail Text** field.

6. Use the **Wait** field to define how long PowerChute *plus* waits before sending e-mails. The default is 5 seconds.

   *Note that PowerChute plus notifies users only when the event lasts for the defined **Wait** period. For example, for a setting of 10, users don't receive an e-mail if the event lasts less than 10 seconds.*

7. Click **OK** to save your changes and exit the dialog box.

## How to Page Users

The **Page Users** action — available through **Event Actions...** on the Configuration menu — enables PowerChute *plus* to page selected users when an event occurs.

Use the following steps to configure the **Page Users** action for an event:

1.  In the **Event Actions...** dialog box, highlight the event from the **Events** list.

2.  Click on the check-box for the **Page Users** action to enable it, if necessary.

3.  Click **Options...** for the **Page Users** action to open the Page dialog box:

The event name displays along the top, **Comms Lost While on Battery** in the example figure.

Pageable Users shows those users already created.
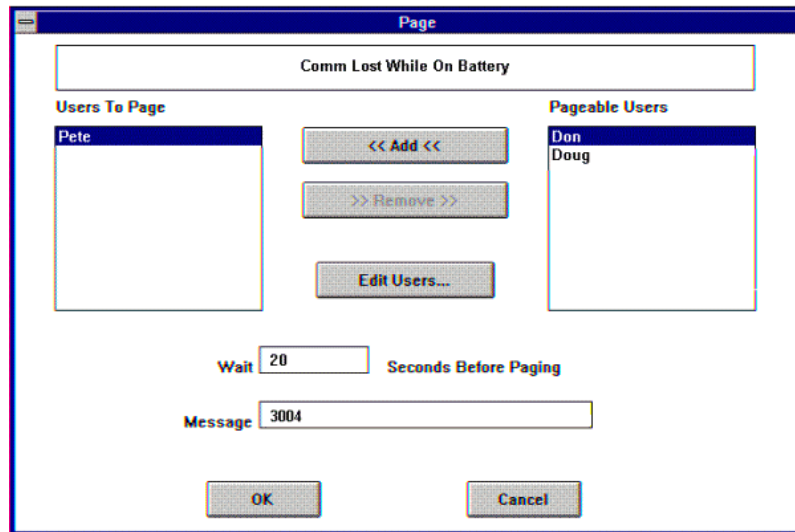


4.  Configure which users to page when the event occurs:

    - To specify a user to notify, highlight a user in Pageable Users, and click **<<Add<<** .

    - To remove a user, highlight the name in Pageable Users, and click >>**Remove**>>.

    - Click the **Edit Users...** button to actually create new users. See **How to Set Up Event Users**.

5.  Use the **Wait** field to define how long PowerChute *plus* waits before paging users.

    *Note that PowerChute plus pages users only when the event lasts for the defined **Wait** period. For example, for a setting of* 10*, users don't get paged if the event lasts less than 10 seconds.*

6.  Though you can define a new numerical-only value in the **Message** field, APC recommends using the default value—the unique ID code for the selected event.

    See **List of ID's with Severity, Event, and UPS** for a detailed explanation of each severity level and also for a complete list of FlexEvents and their ID codes.

7.  Click **OK** to save your changes and exit the dialog box.

*Note:*
*APC recommends that you configure paging only for code 3 (severe problem) events.*

*To see about setting up a pager service, like SkyPager, see **How to Use the Pager Services Dialog Box**.*

## How to Shut Down a Server

The **Shut Down Server** action—available through the Configuration menu, see **Event Actions...**—enables PowerChute *plus* to shut down the server when an event occurs.

The table following details default conditions and possibilities for the action as relating to various UPSs:

| Event using the Shut Down Server action | Matrix-UPS[a] | Symmetra Power Array[b] | Smart-UPS |
|---|---|---|---|
| **Base Module Fan Failure** | action defaults to **ON** | action defaults to **OFF** | **N.A.** |
| **Base Module Power Supply Failure** | action defaults to **ON** | action defaults to **OFF** | **N.A.** |
| **Comm Lost While On Battery** | action defaults to **ON** | action defaults to **OFF** | action defaults to **ON** |
| **Low Battery Condition** | Shut Down Server action is **ON** and *can't be disabled* for this event | | |
| **UPS On Bypass: Failure** | action defaults to **ON** | action defaults to **OFF** | **N.A.** |
| **UPS Output Overload** | action defaults to **ON** | action defaults to **OFF** | action defaults to **ON** |
| **System Shutdown Starting** | Shut Down Server action is **ON** and *can't be disabled* for this event | | |
| **UPS On Battery**[c] | action defaults to **ON** | action defaults to **OFF** | action defaults to **ON** |

a. For the Matrix-UPS and the Smart-UPS, you can disable shut down for all applicable events except where explicitly stated otherwise in the table.

b. Because of fault tolerance and longer available run-time, Symmetra doesn't have the default set to ON for most of these events. However, you can choose to set them to ON for the actions.

c. Caution: If you disable the Shut Down Server action for the UPS On Battery event, the UPS runs on battery and waits for a Low Battery Condition event before PowerChute starts a server shutdown. See **Chapter 8, Configuring your System Shutdown**, for more information.

Use the following steps to configure the **Shut Down Server** action for an event:

1. In the **Event Actions...** dialog box, highlight the event from the **Events** list.

2. Click on the **Shut Down Server** action check-box to mark the box. (Because this action cannot be disabled for the **Low Battery Condition** and **System Shutdown Starting** events, the action is grayed out; however, the **Options** button is still available and used).

3. Click **Options...** for the **Shut Down Server** action to open the Shutdown Server dialog box.

   The example following shows the dialog when you have chosen the UPS on Battery event.

```
┌─────────────────────────────────────────────────────────────┐
│ ▬                    Shutdown Server                          │
├─────────────────────────────────────────────────────────────┤
│  ┌─────────────────────────────────────────────────────────┐ │
│  │                    UPS On Battery                       │ │
│  └─────────────────────────────────────────────────────────┘ │
│                                                               │
│                                  ┌──────────┐                 │
│     Begin Shutdown Sequence      │ 30       │   Seconds       │
│                                  └──────────┘                 │
│                                                               │
│         ┌──────────┐              ┌──────────┐                │
│         │   OK     │              │  Cancel  │                │
│         └──────────┘              └──────────┘                │
└─────────────────────────────────────────────────────────────┘
```
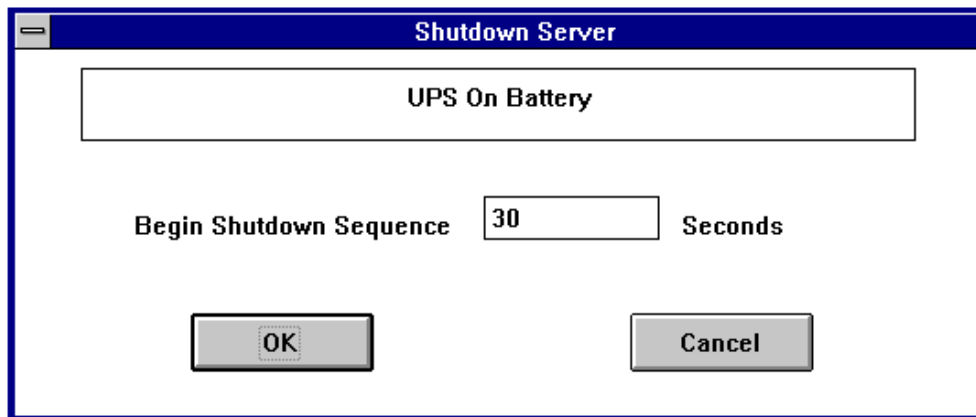
4.  Use the **Begin Shutdown Sequence** field to define how long PowerChute *plus* waits before initiating a server shutdown.

    The default is 300 seconds for the **UPS On Battery** event, 60 seconds for the **System Shutdown Starting** event itself, and 30 seconds for all other events.

    *Caution:*
    *Do not change the values for a Low Battery Condition or System Shutdown Starting event without first making sure you understand the possible consequences of the change. See Chapter 8, Configuring your System Shutdown, for more information.*

5.  Click **OK** to save your changes and exit the dialog box.

The **Shut Down Server** action initiates the **System Shutdown Starting** event *if* the condition that caused the event lasts longer than the Shut Down Server delay value.

For example, if a **Utility Power Restored** event occurs before the Shut Down Server delay expires, no shutdown occurs. However, when a shutdown begins, you cannot stop it.

# How to Set Up Event Users

You can use e-mail, paging, or broadcast messages to notify users that an event has occurred. Specify these users through the **Event Users...** dialog box.

You can open the dialog box in the following ways:

- Select the **Event Users...** option on the **Configuration** menu.

- Click the **Edit Users...** button in one of the following dialog boxes to configure a user to receive notification of an event:

    - Notify Administrators
      (see **How to Notify Administrators**)

    - Notify Users
      (see **How to Notify Users**)

    - Send E-Mail
      (see **How to Send E-Mail**)

    - Page Users
      (see **How to Page Users**)



*Note:*
*Use the Event Users dialog box to create and configure individual users. To go on to configure the actual notification of these users, please see **How to Notify Users**.*

The table following describes how to use the Event Users dialog box.

| To Do This Task | Perform These Actions |
|---|---|
| Add a user to the list. | 1. Type the new user name in the data entry box at the top right.<br><br>2. Click **Add**. |
| Change a listed user name. | 1. In the list box at top left, highlight the user.<br><br>2. In the data entry box at the to right, edit or replace the name.<br><br>3. Click **Rename**. |
| Delete a user from the list. | 1. In the list box at top left, highlight the user.<br><br>2. Click **Delete**. |
| Enable PowerChute *plus* to send broadcast messages to a selected user. | 1. In the list box at top left, highlight the user.<br><br>2. Select **Messaging**. (Mark the **Messaging Enabled** box.)<br><br>3. Use **Notification Address** to specify the selected user's network address. |
| Enable PowerChute *plus* to page a selected user. | 1. In the list box at top left, highlight the user.<br><br>2. Select **Paging**. (Mark the **Paging Enabled** box.)<br><br>3. Enter the **Access Number** (telephone number) for the paging service.<br><br>4. Enter the **Access Code** for the selected user's pager.<br><br>5. Select the **Pager Service**.<br><br>6. Click **Edit Services...** to use the "Pager Services" dialog box to add or change a paging service.<br>(See **How to Use the Pager Services Dialog Box** for information about how to configure paging services.) |
| Enable PowerChute *plus* to send e-mail to a selected user. | 1. In the list box at the left, select the user.<br><br>2. Select **E-Mail**. (Mark the **E-Mail Enabled** box.)<br><br>3. Enter the **E-Mail Address** for the selected user. |
| Save changes. | Click **OK** to exit the dialog box. |
| Cancel changes. | Click **Cancel** to exit the dialog box. |

## How to Use the Pager Services Dialog Box

The Pager Services dialog box enables you to add and edit pager services, like SkyPager, that facilitate electronic paging. The dialog is accessed only through the Event Users dialog—see **How to Set Up Event Users**.

The paging feature uses a modem, connected to the PowerChute *plus* server, to send information to numeric pagers only, that is, pagers that only display numbers. (PowerChute *plus* cannot *receive* information from a pager.)

*Note: To use the paging feature on UNIX platforms, you must have UUCP installed and running on all computers running PowerChute plus for UNIX.*



See the following table for information on using the dialog box. See also **How to Page Users**.

| Task | Actions and Explanations |
|---|---|
| Add a service | 1. Type in the new service name in the text box, upper right. This cannot be identical to a FlexEvent user name.<br>2. Click **Add**.<br>3. Use the other fields in the dialog box to define the service's **Answer Delay**, **Access Code Delay**, and **Exit Code** values. |
| Change a listed service's name | 1. Highlight the listed service.<br>2. Type in the new service name in the text box, upper right.<br>3. Click **Rename**. |
| Delete a service | 1. Highlight the listed service.<br>2. Click **Delete**. |
| To enter or edit:<br>• Answer Delay<br>• Access Code Delay<br>• Exit Code | Answer Delay is the time that PowerChute waits for the receiving unit to answer. If in doubt, try entering 10 seconds here.<br>Access Code Delay is the time PowerChute waits after sending the access code before sending the message. If there is no number here, type 0.<br>Exit Code allows the modem and pager to disengage properly. It is sent after the message. Try ##. |

# Chapter 5: System Monitoring and Shutdown

This chapter describes the PowerChute *plus* Main Screen's **System menu** options, dealing with changing and configuring your server and exiting PowerChute *plus*.

| System | Logging | Configuration | Diagnostics | Help |
|---|---|---|---|---|
| **Monitor Different Server...** | | | | |
| Schedule Server Shutdown... | | | | |
| Shutdown Server Now... | | | | |
| Exit | | | | |
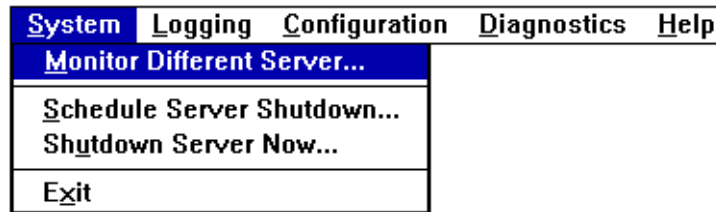
Selecting the **Exit** option from the **System** menu closes the PowerChute *plus* User Interface Module. The background program, UPS Monitoring Module, continues to monitor the UPS and log data.

The other options, shown in the figure above, are described in the following sections:

- **Monitor Different Server...**

- **Schedule Server Shutdown...**

- **Shut Down Server Now...**

## Monitor Different Server...

If your workstation is part of a network and you have the necessary authorization, you can use the **Monitor Different Server...** option on the **System menu** to monitor an APC UPS connected to another server.

If you have a workstation that is not part of a network, the **Monitor Different Server...** option is dimmed and unavailable to you.

*Note:*
*On UNIX systems, TCP/IP must be installed for client workstations to monitor servers. On PC-based UNIX systems, if no network card is present, you will only be able to monitor the local system.*

1.  Choose **Monitor Different Server** from the **System menu**.

```
┌─────────────────────────────────────────────────────────┐
│ ▬                     Monitor Server                      │
├─────────────────────────────────────────────────────────┤
│  ┌───────────────────────────────────────────────────┐  │
│  │ NETCOMP1 (Smart-UPS 600 On Line)                  │  │
│  │ NETCOMP2 (Smart-UPS 900 On Line)                  │  │
│  │ SERVER3 (Smart-UPS 1250 On Line)                  │  │
│  │                                                   │  │
│  │                                                   │  │
│  └───────────────────────────────────────────────────┘  │
│                                                          │
│        ┌──────────┐              ┌──────────┐            │
│        │    OK    │              │  Cancel  │            │
│        └──────────┘              └──────────┘            │
└─────────────────────────────────────────────────────────┘
```
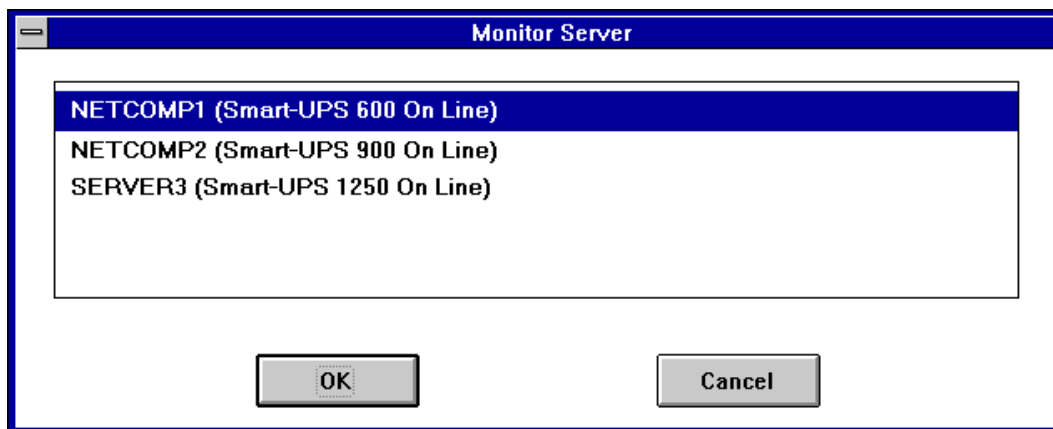
2.  Highlight a server from the presented list.

    The Server list displays those servers on the same domain or the same UNIX subnetwork as the machine on which you are logged in.

3.  Click **OK**.

4.  Type the password and choose **OK**.

    Note that the password is case-sensitive.

# Schedule Server Shutdown...

You can configure PowerChute *plus* to shut down your server automatically on a periodic basis. Follow the steps below.

From the **System menu**, choose **Schedule Server Shutdown** to see the dialog box:

The dialog box splits into two main areas:

- Daily Shutdown Parameters enables or disables daily shutdowns.

- Weekly Shutdown Parameters enables or disables weekly shutdowns.

Weekly Shutdown Parameters always take precedence over Daily Shutdown Parameters.

For example, if you configure daily shutdown for 5:30 P.M. and weekly shutdown for Friday at 5:00 P.M. , your system shuts down at 5:00 P.M. on Friday and at 5:30 P.M. on every other day.



1. Click on a check box to the left of either Daily Shutdown or Weekly Shutdown to enable the options in the required area (they are grayed out before you do this).

2. For both daily and weekly, type in a shutdown time and reboot time, and specify whether A.M. or P.M.

3. In addition, for weekly shutdowns, you need to choose a day for the shutdown and reboot from the drop-down boxes.

4. Specify a value in the **Shutdown Delay** field to set the time period between the first shutdown warning message and actual shutdown.

5. Choose a value in the **UPS Turn Off Delay** list box to set the time period the UPS waits after server shutdown before going into sleep mode. (In sleep mode, the UPS conserves energy by turning off its power outlets and no longer supplying power to connected equipment).

6. When you finish configuring shutdown parameters, select the **OK** button to store the new values or the **Cancel** button to exit without saving any changes.

## Shut Down Server Now...

The **Shut Down Server Now...** option enables you to manually shut down your server. This, however, does not put your UPS into "sleep mode", rather it turns it off. As a result, to restore power to your system after using the option, you must manually turn on the UPS.

Choose **Shut Down Server Now...** from the **System menu** to see the warning box shown below.

The first sentence of the warning names the server or workstation to be shut down.

*** WARNING ***

This function will shutdown

NETCOMP1

and then turn off the UPS.

Afterwards you will need to manually turn the UPS back on to restore power to the system.
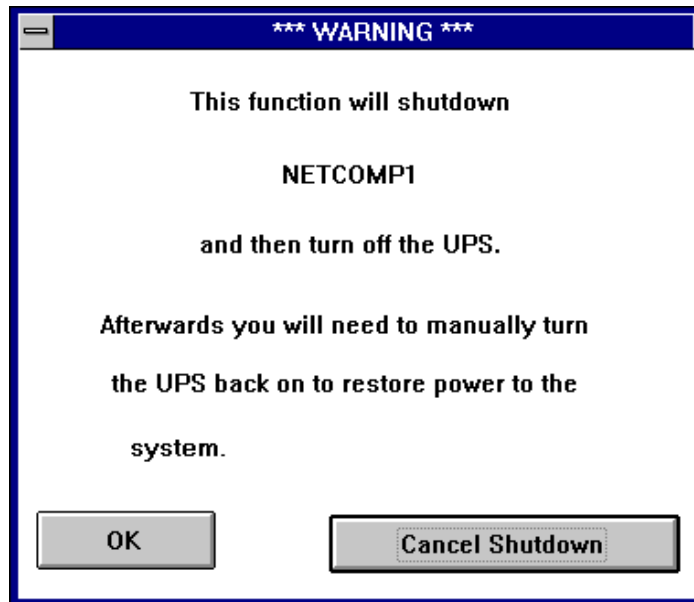
OK          Cancel Shutdown

1.  Cancel the shutdown before it starts by clicking on the **Cancel Shutdown** button. Click on the **OK** button and PowerChute *plus* displays the Shut Down Server dialog box.

**Shut Down Server**

Shutdown Delay  900  seconds

UPS Turn Off Delay  020  seconds

OK          Cancel Shutdown
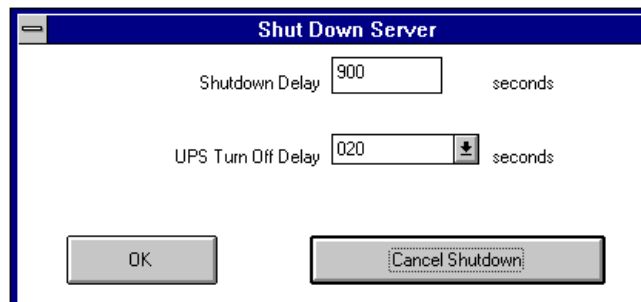
2.  Type a **Shutdown Delay** time, representing the time period PowerChute *plus* waits *before* generating the **System Shutdown Starting** event. The default is 900 seconds (15 minutes). This shutdown delay provides time for notification messages to be sent to users.

    (This shutdown delay is *not* the shutdown delay configured for the **System Shutdown Starting** event itself, a delay that allows time for shutdown-related activities such as the running of a command file).

3.  Choose a value in the **UPS Turn Off Delay** list box to set the time period the UPS waits after server shutdown before turning itself off.

    *Note that changing this value here also changes it in the* **UPS Shutdown Parameters... in Chapter 3** *dialog box on the Configuration menu.*

> *Caution:*
> ***Increasing the UPS Turn Off Delay without considering other configured delay periods could cause PowerChute plus** to use all available run time without fully shutting down your system. See* Chapter 8, Configuring your System Shutdown *for information on correctly configuring delay periods.*

4. Click on the **OK** button to proceed with the shutdown, or click on the **Cancel Shutdown** button to cancel the shutdown.

   If you click on the **OK** button, this Shut Down Server Now... option changes to Cancel Server Shutdown, providing another opportunity to cancel the shutdown while the operating system is still running.

# Chapter 6: Logging Data

This chapter describes the **Logging** menu options.

| System | Logging | Configuration | Diagnostics | Help |
|--------|---------|---------------|-------------|------|

Open <u>E</u>vent Log...
Open <u>D</u>ata Log...
Log <u>O</u>ptions...

These menu options facilitate viewing FlexEvent information and also data received from the UPS and from a Measure-UPS. You can also configure certain parameters, including the enabling and disabling of either of the two types of log files and their file sizes.

The menu options are discussed in the following sections, beginning with **Log Options...** as a good introduction to the usage of log files.

- **Log Options...**
- **Open Event Log...**
- **Open Data Log...** (not available when using simple signalling)

# Log Options...

Through **Log Options** you set the operating parameters of how PowerChute *plus* logs data.

Selecting **Log Options...** from the **Logging menu** displays the Log Options dialog box shown below. (The dialog can also be accessed through the **Options** button in either the **Open Event Log...** or **Open Data Log...** dialog boxes).

The two log files available are the Event and Data Logs: discussed in **Outline of the Event and Data Logs**.

The individual fields in this dialog box and how to use them are discussed in **Configuring the Event and Data Logs**.

| | |
|---|---|
| **Log Options** | |

**Event Log Configuration**

☐ Enable Event Logging

Event Log Filename `e:\PWRCHUTE\PWRCHUTE.LOG`

Log File Maximum Length `50000` bytes

**Data Log Configuration**

☐ Enable Data Logging

Data Log Filename `e:\PWRCHUTE\PWRCHUTE.DAT`

Log File Maximum Length `50000` bytes

Data Recording Interval `600` seconds

[ OK ] [ Cancel ]

## Outline of the Event and Data Logs

The **Event Log** records specific events related to the UPS or Powerchute *plus* — FlexEvents. Examples are Powerchute starting and stopping, and the UPS going on battery.

The **Data Log** is like a snapshot of the state of the UPS and your AC power supply over a certain time interval. An example of data recorded is UPS output voltage.

Some differences between the Event and Data Logs are outlined in the table below:

| Event Log | Data Log |
|---|---|
| Records only when an event happens. | Records during a specified time interval, whatever is happening. |
| You can configure what to record. | You *cannot* configure what to record. |

*Note:*
*Powerchute also displays some Event Log information in the **Last Two Events** window on the Main Screen. Configuring and viewing events to be logged is described in **How to Configure Actions in Chapter 4**.*

*For more information on FlexEvents, see **Appendix A, FlexEvents Reference**.*

## Configuring the Event and Data Logs

To configure event and data logging, you can change any of the default values displayed.

    1.   First, you choose **Log Options...** from the **Logging** menu.

```
┌─────────────────────────── Log Options ───────────────────────────┐
│ ┌─ Event Log Configuration ──────────────────────────────────────┐ │
│ │     ☐ Enable Event Logging                                      │ │
│ │                                                                 │ │
│ │     Event Log Filename  [e:\PWRCHUTE\PWRCHUTE.LOG            ]   │ │
│ │                                                                 │ │
│ │     Log File Maximum Length  [50000        ]   bytes            │ │
│ │                                                                 │ │
│ └─────────────────────────────────────────────────────────────────┘ │
│ ┌─ Data Log Configuration ───────────────────────────────────────┐ │
│ │     ☐ Enable Data Logging                                       │ │
│ │                                                                 │ │
│ │     Data Log Filename  [e:\PWRCHUTE\PWRCHUTE.DAT            ]    │ │
│ │                                                                 │ │
│ │     Log File Maximum Length  [50000        ]   bytes            │ │
│ │                                                                 │ │
│ │     Data Recording Interval  [600     ]   seconds               │ │
│ └─────────────────────────────────────────────────────────────────┘ │
│              [   OK   ]              [ Cancel ]                      │
└────────────────────────────────────────────────────────────────────┘
```

    2.   Event logging is `enabled` by default. (To disable the logging of all events, click the **Enable Event Logging** check box and that area will go gray).

    3.   In the **Event Log Filename** field, enter the path and file name for the PowerChute Event Log file. The default file name is **powerchute.log**. The default location is your PowerChute directory

    4.   Enter the **Log File Maximum Length** value in bytes. (The default is `50,000` bytes.)

    5.   Data logging is also `enabled` by default. (To disable all data logging, unmark the **Enable Data Logging** check box and that area will go gray).

    6.   In the **Data Log Filename** field, enter the path and file name for the PowerChute data file. The default file name is **powerchute.dat**. The default location is your PowerChute directory.

    7.   Enter the **Log File Maximum Length** value in bytes. The default is `50,000` bytes, which is large enough to hold approximately a week of data recorded at 10 minute intervals.

    8.   Enter the **Data Recording Interval** value in seconds. (The default is 600 seconds, and the minimum allowed value is 5 seconds).

       Choosing the time interval at which data is logged controls how quickly the Data Log fills. The Data Log file usually fills much more quickly than the Event Log file, which receives new entries only when events are generated.

    9.   When you finish entering or changing Data Log file parameters, select the **OK** button to save the new values and close the dialog box.

When either of the log files reaches its maximum length, PowerChute *plus* deletes the first one-third of the file (containing the older data) and continues logging data to the file.

## Turning off Event and Data Logging

To disable (turn off) event logging, uncheck the **Enable Event Logging** check box in the Log Options dialog box as described in **Log Options...**.

If you disable event logging, PowerChute *plus* discontinues logging all events, including those for which the **Log Event** action is configured. The default setting for all events is to log them.

*Note:*
*For information on discontinuing the logging of individual events, see **Event Actions... in Chapter 3**.*

To disable (turn off) data logging, uncheck the **Enable Data Logging** check box in the Log Options dialog box as described in **Log Options...**.

# Open Event Log...

To actually view the Event Log, choose the **Open Event Log...** option from the Logging menu.

The log contains not just the actual event but the date and time it occurred.

To view portions of the log not initially displayed, use the dialog box's right-hand scroll bar.
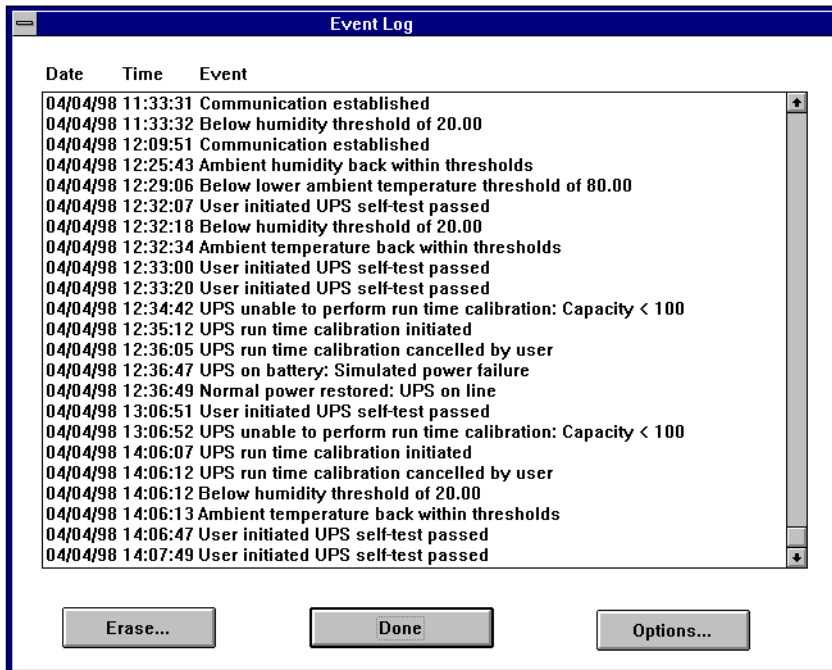


Use the buttons at the bottom of the dialog box as follows:

| Button | Function |
|---|---|
| **Options...** | To display the Log Options dialog box as described in **Log Options...** |
| **Erase...** | To delete the contents of the Event Log |
| **Done** | To return to the Main Screen |

You can use one of the following alternative methods to view the Event Log:

•   Double-click on the **Last Two Events** window on the PowerChute *plus* Main Screen.

•   Use any ASCII text editor to open the file directly in a terminal window.

•   Use the UNIX more command directly in a terminal window, in the following form.

```
more powerchute.log <Enter>
```

For more information on event logging see the following:

•   **Outline of the Event and Data Logs**

•   **Configuring the Event and Data Logs**

•   **Turning off Event and Data Logging**

## Open Data Log...

To actually view the Data Log, choose the **Open Data Log...** option from the Logging menu. Note that the **Open Data Log..**. option is not available with simple signalling.

To view portions of the log not initially displayed in the dialog box, use the right-hand scroll bar.

As described in the following table, the dialog box displays the data for each event under set column headings.

If you are not using a Measure-UPS, the Data Log omits T-Amb and Humidity data.



| Column | Content |
|--------|---------|
| **Date** | Date of the event (month, day, and year) in *MM/DD/YY* format. This can't be changed. |
| **Time** | Time the event occurred, in 24 hour format (*HH:MM:SS*) |
| **V-Min** | Minimum input voltage, in volts (AC), registered during the recording interval |
| **V-Max** | Maximum input voltage, in volts (AC), registered during the recording interval |
| **V-Out** | Output voltage, in volts (AC), that the UPS is supplying to attached equipment |
| **V-Batt** | UPS battery voltage in volts (DC) |
| **Freq** | UPS output frequency in Hertz |
| **Load** | Percentage of the UPS rated load that attached equipment used during the recording interval. |
| **T-UPS** | UPS temperature in Celsius. With a charged battery, this temperature is approximately 40° Celsius. When the battery is charging heavily, this temperature can be as high as 50° Celsius. At the end of a heavy load discharge, this temperature can be as high as 65° Celsius. A temperature over 75° Celsius indicates a failed fan, blocked ventilation, or other malfunction. |
| **T-Amb** | Ambient environmental temperature in Celsius (a Measure-UPS parameter). |
| **Humidity** | Relative humidity, that is, the recorded humidity as a percentage of total humidity (a Measure-UPS parameter). |

Use the buttons at the bottom of the dialog box as follows:

| Button | Function |
|---|---|
| **Options...** | To display the Log Options dialog box as described in **Log Options...** |
| **Erase...** | To delete the contents of the Data Log |
| **Done** | To return to the Main Screen |

For more information about data logging, see the following:

- **Outline of the Event and Data Logs**
- **Configuring the Event and Data Logs**
- **Alternative Ways to View the Data Log**
- **Turning off Event and Data Logging**
- **Appendix D, Graphing the Data Log**

## Alternative Ways to View the Data Log

Instead of using the **Open Data Log...** option in the **Logging** menu, you can use one of the following methods to view the Data Log file (to find the filename, see **Configuring the Event and Data Logs**).

- Use any ASCII text editor to open the file directly in a terminal window.
- Use the UNIX `more` command directly in a terminal window in the following form.

```
more powerchute.dat <Enter>
```

When you use one of these methods for viewing the log, the records display similarly to the following sample records:

```
04/04/98,11:45:00,119.0,120.2,119.6,27.40,60.00,033.2,033.7,28.81,014.5
04/04/98,11:46:00,119.0,120.2,119.0,27.40,60.00,033.2,033.7,28.81,015.1
```

The fields are separated by commas, but the data items in each record are in the same order as they are in the Data Log dialog box. To interpret a data record, see the Data Log dialog box column names and their explanations in **Open Data Log...**.

If you do not have a Measure-UPS on your system, the fields following the last two commas in Data Log file records are blank, as in the following example.

```
04/04/98,11:48:00,119.0,120.2,119.0,27.40,60.00,032.7,033.7,     ,
```

# Chapter 7: Performing UPS Diagnostics

This chapter describes the options available through the **Diagnostics** menu of the Powerchute *plus* Main Screen, enabling you to test your UPS.

Selecting the **Diagnostics** menu from the menu bar displays a drop-down menu, shown below, with the following menu options:



See the following sub-sections for more information:

- **Schedule UPS Tests...**
- **Initiate UPS Self Test**
- **Initiate Run Time Calibration**
- **Simulate Power Failure**
- **Test UPS Alarm**
- **Put UPS on Bypass**

# Schedule UPS Tests...

The **Schedule UPS Tests...** option, available from the **Diagnostics** menu, enables you to control the date and time to run a self-test and a calibration on the UPS.



The two separate areas of this dialog are discussed in separate sections:

• **Self Test Period**

• **UPS Run Time Calibration**.

## Self Test Period

In the **Self Test Period** section of the Schedule UPS Tests dialog box, available through **Diagnostics/Schedule UPS Tests...**, four radio buttons, explained in the table below, disable or set when automatic UPS self-tests occur. APC recommends that you schedule self-tests to be performed periodically to ensure that the UPS is working correctly.

| Button | Function |
|---|---|
| **Off** | Turns off automatic self-testing |
| **At Turn On** | Schedules a self test at UPS turn-on only, i.e. when the UPS reboots |
| **Daily** | Schedules a daily self-test. Underneath Daily, specify the time of the daily test. Enter the hour in the first box and the minute in the second box, and select either the **AM** or **PM** radio button. |
| **Weekly** | Schedules a weekly self-test schedule. Underneath Weekly, specify the day and time for the test to occur. Select the day in the drop-down list box, enter the hour in the second box, and enter the minute in the third box. Then select either the **AM** or **PM** radio button. |

## UPS Run Time Calibration

A UPS run-time calibration calculates the battery run-time available for a specific UPS load over time. Choosing **Diagnostics/Schedule UPS Tests...** brings up a dialog which enables you to schedule automatic calibrations.

*Note:*
*When scheduling a calibration, take into account that the process is lengthy, deeply discharges the UPS battery, and temporarily reduces run-time until the UPS battery recharges. Battery capacity must be at 100%.*

In the **UPS Run Time Calibration** area of the Schedule UPS Tests dialog box, select from two radio buttons:

| Button | Function |
|--------|----------|
| **Off** | Turns off scheduled calibration. |
| **Monthly** | Schedules monthly run-time calibrations. <br><br> Underneath Monthly, specify the day and time of the monthly calibration. Select the day in the drop-down list box, enter the hour in the middle box, and enter the minute in the third box. Then select either the **AM** or **PM** radio button. <br><br> PowerChute *plus* performs the scheduled run-time calibration each month on the first occurrence of the day you select. For example, if you choose Monday, a run-time calibration starts on the first Monday of each month at the time you specify. |

Because accurate run-time prediction is important to ensuring adequate UPS protection of your system, APC recommends scheduling a run-time calibration once every month.

# Initiate UPS Self Test

Selecting the **Initiate UPS Self Test** option from the Diagnostics menu briefly switches the UPS to battery power and tests the UPS to ensure proper operation.
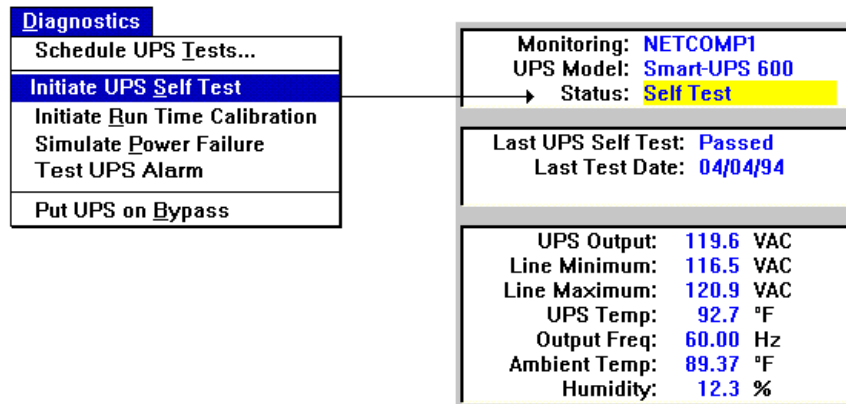


When you choose to run a self-test, the UPS switches to battery momentarily and performs internal diagnostics. The Status field on the Main Screen, on the right above, changes to Self Test during the test.

Underneath the Status field, the result of the self test displays afterwards. See **Self-Test and Battery Information Window in Chapter 2**.

*Note:*
*Your ability to initiate an immediate UPS self-test with this menu option is not affected by the self-test scheduling options of the Schedule UPS Tests dialog box, including the Off setting. See **Self Test Period**.*

## Initiate Run Time Calibration

Selecting the **Initiate Run Time Calibration** option from the Diagnostics menu initiates a UPS calibration. This determines the UPS battery run-time available for a specific UPS Load.
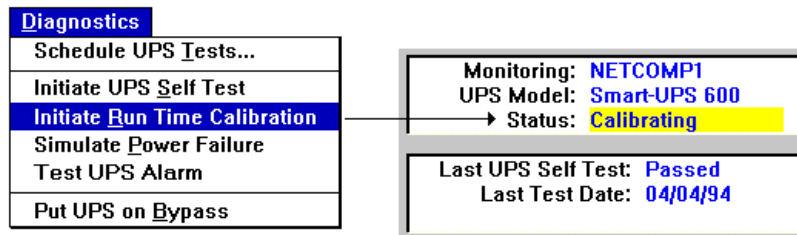
A run-time calibration is lengthy, deeply discharges the UPS battery, and temporarily reduces UPS run-time until the battery recharges. Battery capacity must be at 100% to perform a run-time calibration. During the calibration, the battery capacity shown on the Battery Capacity bar graph on the Main Screen decreases.

After you select the Initiate Run Time Calibration option, the menu option changes to **Cancel Run Time Calibration**, enabling you to cancel the calibration at any time. Note that your ability to initiate an immediate UPS run-time calibration is not affected by a scheduled calibration as described in **Schedule UPS Tests...**.

The Status field on the Main Screen, on the right above, changes to **Calibrating** during calibration.

See **Appendix A, FlexEvents Reference** for descriptions and message text for the following three events associated with calibration:

- **UPS Run Time Calibration Initiated**

- **UPS Run Time Calibration Completed**

- **Cancel Battery Calibration**

## Simulate Power Failure

Selecting the **Simulate Power Failure** option from the Diagnostics menu briefly switches the UPS to battery power, testing the UPS's capability to perform such a switch if utility power fails.
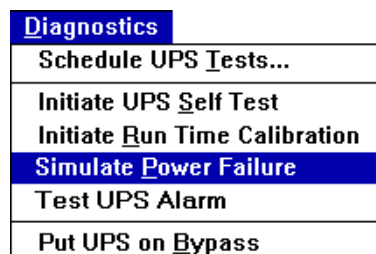
When the UPS switches to battery power, PowerChute *plus* generates the **UPS On Battery** event and issues the message `UPS on Battery: Simulated Power Failure`.

When the UPS resumes non-battery operation, PowerChute *plus* generates the **Power Restored** event.

# Test UPS Alarm

Selecting the **Test UPS Alarm** option from the Diagnostics menu causes the UPS to flash its front panel lights briefly and emit a long beep.
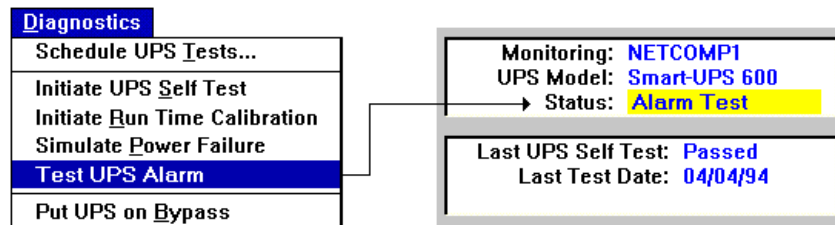
Use this test to ensure that PowerChute *plus* is communicating with the UPS or to locate the UPS in a crowded machine room or wiring closet. Performing an alarm test generates no events.

*Note:*
*If you are monitoring a Symmetra Power Array, this option is displayed in grey and is unavailable because a Symmetra Power Array has no alarm.*

# Put UPS on Bypass

The **Put UPS on Bypass** option on the Diagnostics menu is available only if you have a Symmetra *Power Array* or Matrix-UPS.

Selecting it puts the Symmetra *Power Array* or Matrix-UPS into bypass mode so that you can perform maintenance. In bypass mode, these UPSs function as voltage conditioners only and provide protection from power surges and minor power disturbances, but not from voltage sags, brownouts, or blackouts.
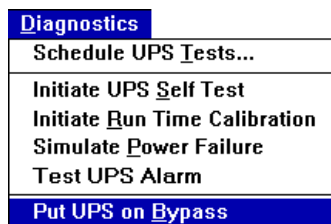
After you select it, the menu option changes to **Take UPS off Bypass** so that you can return the Symmetra *Power Array* or Matrix-UPS to normal operation when you complete your maintenance activity.

# Chapter 8: Configuring your System Shutdown

The purpose of PowerChute *plus* is to safely shut down an operating system when a power failure occurs. To do this, PowerChute *plus* needs the UPS to provide battery power to the system while PowerChute sequences shutdown events in their proper order.

This chapter tells you the steps involved in a shutdown and how to use the Configuration menu options to tailor your shutdown sequence to your own hardware and software. This involves configuring certain delay times during both shutdown and wakeup.

As illustration, this chapter gives two example cases of a computer system shutting down.

These topics are covered in:

- **Configuring Shutdown and Wakeup Delays**
- **Case 1: Power Failure with Enough UPS Run Time Remaining**
- **Case 2: Power Failure with UPS Run Time = Low Battery Signal Time**

*Note:*
*This chapter assumes you have already read **Chapter 4, How to Configure FlexEvents**, and also have a thorough understanding of the material in **Chapter 3, How to Configure PowerChute plus**.*

## Configuring Shutdown and Wakeup Delays

In any power failure, as the UPS can only provide battery operation for a certain amount of time, PowerChute *plus* takes immediate action to shut down the operating system in stages. The specific steps are explained in this section.

The shutdown and restart process, including the configurable delay periods, works as follows:

**Shutting Down Process**

| This happens... | ...leading to this... | ...configurable at |
|---|---|---|
| A power failure occurs | PowerChute *plus* generates a **UPS On Battery** event | **Configuration/Event Actions** (see **How to Configure Actions in Chapter 4**) |
| PowerChute waits the delay time specified by the **UPS on Battery** event; default is 300 seconds/5 mins. | Allows time for PowerChute *plus* to notify users of the shutdown and also to cancel the shutdown if power returns during the delay. | The **Notify Users** action for the **UPS on Battery** event |
| Delay time expires. | PowerChute generates the **System Shutdown Starting** event. (Note that the system shuts down after this event is generated even if power returns). | **Configuration/Event Actions** at the **Options** button for the **Shut Down Server** action . |
| PowerChute waits the delay time specified by **System Shutdown Starting**; default is 30 seconds. | PowerChute *plus* generates the **System Shutdown Complete** event and permits no further processing. | No configuration is possible with this event except whether to log or not (under **Configuration/Event Actions**) |
| The UPS waits the time configured by the **UPS Turn Off Delay** parameter[a]. | - | **Configuration/UPS Shutdown Parameters** (see **UPS Shutdown Parameters... in Chapter 3**) |
| - | Smart-UPS, Matrix-UPS, and Symmetra *Power Array* turn off their outlets and wait in sleep mode for power to return. Back-UPS turns off. | - |

a.PowerChute *plus* initiates the **UPS Turn Off Delay** parameter from within the shutdown script. The default time depends on when in the shutdown script it initiates the delay. On UNIX platforms where the parameter comes early in the shutdown, the default is 180 seconds; on others where it comes near the end of the script, the default is 20 seconds. Note that a Back-UPS has no UPS Turn Off Delay.

The UPS provides continuous power from battery until the UPS Turn Off Delay time expires. To have this capability, the following formula must be valid. Please see the table above for explanations on the terminology used. The Run Time graph display is enabled through the **Configuration/Monitoring Preferences** menu option.

| UPS on Battery delay time | + | System Shutdown Starting delay time | + | UPS Turn Off Delay time | must be <= | Run Time bar graph time |
|---|---|---|---|---|---|---|

The next table explains the power-on process for the different UPS types.

**Wakeup parameters while Powering On**

| Model | Condition... | ...Effect |
|---|---|---|
| **Smart-UPS** checks its battery capacity. | If battery capacity >= % specified as **UPS Wakeup Delay (Capacity)**...[a] | ...the **UPS Wakeup Delay (Time)** comes into effect, causing the UPS to wait before switching on its power outlets and allowing the system to boot. |
| | If battery capacity < % specified as **UPS Wakeup Delay (Capacity)**[b]... | ...the UPS first recharges before switching on its outlets and booting the system. |
| **Matrix-UPS/ Symmetra** *Power Array* | **UPS Wakeup Delay (Capacity)** is not a supported parameter for Matrix-UPS/Symmetra. | Waits the time specified as **UPS Wakeup Delay (Time)**, switches on its power outlets, and allows the system to boot up. |
| **Back-UPS** | NA | NA |

a. See **UPS Shutdown Parameters... in Chapter 3** for background on Capacity and Time values.

b. Some older Smart-UPS models first wait the time specified as UPS Wakeup Delay (Time) before checking UPS Wakeup Delay (Capacity) and, if necessary, recharging the battery.

## Recommendations for Timing Shutdowns

APC recommends the following procedures to configure delay times accurately and ensure orderly shutdown.

| Recommendation | Notes |
|---|---|
| Perform a run-time **calibration** monthly to ensure accuracy of the reported Run Time. (A calibration is not possible with simple signalling.) | Perform calibration when the UPS is supporting its usual load. Do *not* unplug equipment normally plugged into the UPS. |
| Configure any shutdown-related **command file** to execute when the **System Shutdown Starting** event occurs. | To calculate and configure the time necessary for a shutdown-related command file to run, perform the following steps.<br><br>1. Record the time necessary for the command file to execute under normal load conditions.<br><br>2. Add the delay time set for the **Run Command File** action to the time you just recorded (see **Overview of Possible Actions for Events**).<br><br>3. Make this total time the shutdown delay time for the the **System Shutdown Starting** event. |
| If your system is complex, and the **UPS Turn Off Delay** is lower than the maximum value of 180 seconds, check your shutdown script to determine what shutdown-related tasks occur after the delay.<br><br>Then time those tasks during a manual shutdown to determine whether to increase your delay. | See PowerChute *plus* Installation Guide for UNIX for the name of the shutdown file (script) that PowerChute *plus* modifies or creates on each supported UNIX platform. |

# Case 1: Power Failure with Enough UPS Run Time Remaining

This section provides a case study of a power failure occurring when the UPS has enough battery run-time remaining to handle the situation.

Case 1 assumes the following crucial delay times pertain:

| Event/ Parameter | ...entered | Delay Time |
|---|---|---|
| **UPS On Battery** | under **Options** in **Shut Down Server** action | **120** seconds (instead of the default value of 300 seconds)<br><br>Shutdown begins 120 seconds, 2 minutes, after the UPS switches to battery power, unless normal power returns. |
| **System Shutdown Starting** | under **Options** in **Shut Down Server** action (grayed out) | **60** seconds<br><br>This shutdown delay allows time for a user-specified command file to execute. |
| UPS Turn Off Delay | in **UPS Shutdown Parameters... in Chapter 3** | **20** seconds<br><br>PowerChute *plus* instructs the UPS to wait this period of time after shutting down the computer before it turns off power to its outlets. (This cannot be configured for simple signalling.) |

In addition, other relevant events and parameters are configured as follows:

| Event/Parameter | entered... | Delay Time |
|---|---|---|
| **UPS on Battery** event notification | in **Notify Users** dialog box | Wait 5 secs before notifying.<br>Notify every 30 seconds. |
| **Run Command** (see **How to Run a Command File in Chapter 4**) | in Run Command File action dialog box under **System Shutdown Starting** event | Wait 5 seconds before executing. |
| **UPS Wakeup Delay (Time)** or **UPS Wakeup Delay (Capacity)** | in **UPS Shutdown Parameters... in Chapter 3** dialog box | If the UPS battery capacity >= the 15% defined in UPS Wakeup Delay (Capacity), then UPS Wakeup Delay (Time) is 0 |

See **Narrative of the Case 1 Shutdown** for the sequence of events and actions during the shutdown.

*Note:*
*For recommendations concerning the situation outlined in this section, see **Recommendations for Timing Shutdowns**.*

## Narrative of the Case 1 Shutdown

**Figure 1, Timeline of Shutdown steps** on the next page shows a typical shutdown and restart due to utility power failure. Following is an analysis of the timeline of events.

1. At 0 seconds, power fails and the UPS starts providing battery power. PowerChute *plus* generates the **UPS On Battery** event and begins the 120 seconds of pre-shutdown delay configured for that event.

2. At 5 seconds, PowerChute *plus* broadcasts the first shutdown message to users. At 30 second intervals, PowerChute *plus* broadcasts the message again until the System Shutdown Starting event commences.

3. At 2 minutes, PowerChute *plus* generates the **System Shutdown Starting** event and starts the 60 second delay configured for that event.

4. At 2 minutes 5 seconds, a user-specified command file executes.

5. At 3 minutes (by which time the command file should have run), the following events occur.

   a. PowerChute instructs the operating system to shut down.

   b. PowerChute generates the **System Shutdown Complete** event.

   c. PowerChute *plus* issues the **UPS Turn Off Delay** instruction from within the UNIX shutdown script. During the **UPS Turn Off Delay** period, the operating system continues, completing whatever remains of the shutdown procedure.

6. The UPS turns off its outlets and goes into sleep mode. On some UNIX systems, which issue the UPS Turn Off Delay during the shutdown sequence, a brief additional delay occurs before the **UPS Turn Off Delay** begins, which in turn delays the turnoff of the UPS.

To complete all the events in the timeline in this example, the UPS must run on battery power for 200 seconds (3 minutes and 20 seconds), or slightly longer. Therefore, for the UPS to complete the shutdown procedure properly, the UPS run-time shown on the **Run Time** bar graph must be greater than or equal to 200 seconds.

| UPS on Battery delay | + | System Shutdown Starting delay | + | UPS Turn Off Delay | <= | Run Time bar graph time |
|---|---|---|---|---|---|---|
| 120 secs | + | 60 secs | + | 20 secs | = 200 secs | The total in the example, 200 secs, must be <= run-time so that the UPS can complete the shutdown procedure. |

UPS on Battery event

1 min.

Notify Users messages:
1st after 5 secs,
then every 30 seconds

System Shutdown Starting event

2 min.

Command file executes after 5 second delay

System Shutdown Complete event

3 min.

Message to UPS to turn off its outlets

UPS Turn Off Delay expires

20 sec

"Sleep" mode

Power restored to UPS

UPS Wakeup Delay (Time) & UPS Wakeup Delay (Capacity)

Computer system reboots
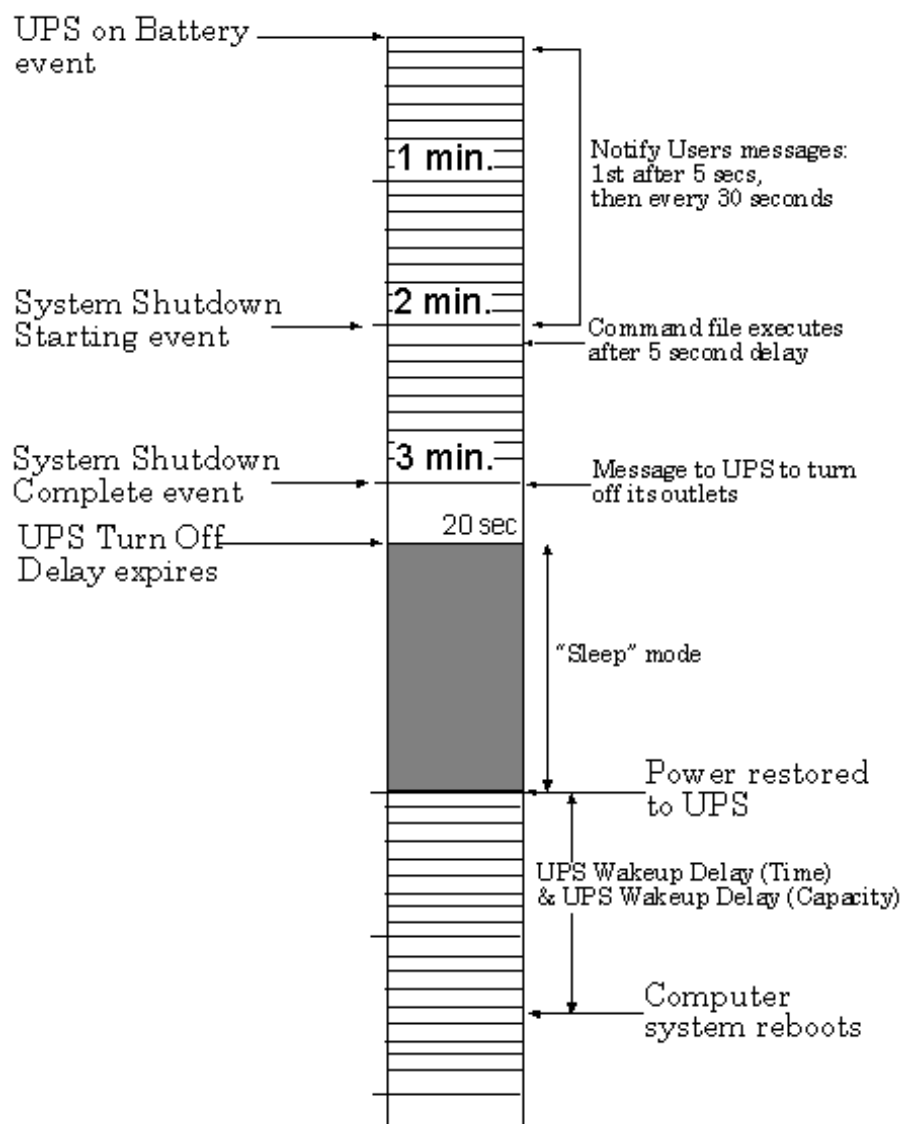
**Figure 1: Timeline of Shutdown steps**

## Case 2: Power Failure with UPS Run Time = Low Battery Signal Time

When the UPS is supplying battery power to the connected computer system during a real or simulated power failure, PowerChute *plus* registers when remaining UPS battery run-time equals the **UPS Low Battery Signal Time** parameter. When this registers, PowerChute generates a **Low Battery Condition** event and begins shutting down the system.

(This UPS Low Battery Signal Time parameter is provided to make sure that the UPS can always support the attached load in a power failure. You configure it in the **UPS Shutdown Parameters...** dialog box).

Case 2 assumes the following important delay times are configured:

| Event or Configurable Delay | entered... | Delay Time |
|---|---|---|
| **Low Battery Condition event** | under **Options** in **Shutdown Server** action (grayed out) | **30** seconds<br><br>Begin shutdown 30 seconds after the Low Battery Condition registers. |
| **System Shutdown Starting delay** | under **Options** in **Shut Down Server** action (grayed out) | **60** seconds<br><br>This shutdown delay allows time for a user-specified command file to execute. |
| **UPS Turn Off Delay** | in **UPS Shutdown Parameters...** | **20** seconds<br><br>PowerChute *plus* instructs the UPS to wait this period of time before it turns off power to its outlets. (This cannot be configured for a Back-UPS.) |

See **Narrative of the Case 2 Shutdown** for the sequence of events and actions during the shutdown.

## Narrative of the Case 2 Shutdown

**Figure 2, Timeline of Shutdown on low battery** on the next page shows the timeline of events that occurs during a power outage when remaining battery run-time reaches UPS Low Battery Signal Time. Following is an analysis of the timeline of events.

1.  At 0 seconds, PowerChute *plus* detects that the UPS run-time equals the **UPS Low Battery Signal Time**. PowerChute *plus* generates the **Low Battery Condition** event and begins the 30 second shutdown delay configured for that event.

2.  At 30 seconds, PowerChute *plus* generates the **System Shutdown Starting** event and begins the 60 second shutdown delay configured for that event.

3.  At 1 minute 30 seconds,

    a.  PowerChute instructs the operating system to shut down.

    b.  PowerChute generates the **System Shutdown Complete** event.

    c.  PowerChute *plus* issues the **UPS Turn Off Delay** instruction from within the UNIX shutdown script. Then, during the **UPS Turn Off Delay** time, the operating system continues, completing whatever remains of the shutdown procedure for that particular UNIX platform.

4.  The UPS turns off its outlets and goes into sleep mode, unless the UPS is a Back-UPS.

To complete all the events in the timeline in the preceding example, the UPS must run on battery power for 110 seconds (1 minute and 50 seconds) or slightly longer. Therefore, for the UPS to complete the shutdown procedure properly, the **Low Battery Signal Time** is set to the default (and lowest allowable) value of 2 minutes.

| Low Battery Condition delay | + | System Shutdown Starting delay | + | UPS Turn Off Delay | <= | Run Time bar graph |
|---|---|---|---|---|---|---|
| 30 secs | + | 60 secs | + | 20 secs | = 110 secs/ 1 min 50sec | The total in this example, 110 secs, must be <= run-time so that the UPS can complete the shutdown procedure. |

Low Battery Condition event

System Shutdown Starting event

30 sec

1 min.

System Shutdown Complete event

30 sec

UPS Turn Off Delay expires

50 sec

2 min.

"Sleep" mode

Power restored to UPS

UPS Wakeup Delay (Time) or UPS Wakeup Delay (Capacity)

Computer system reboots
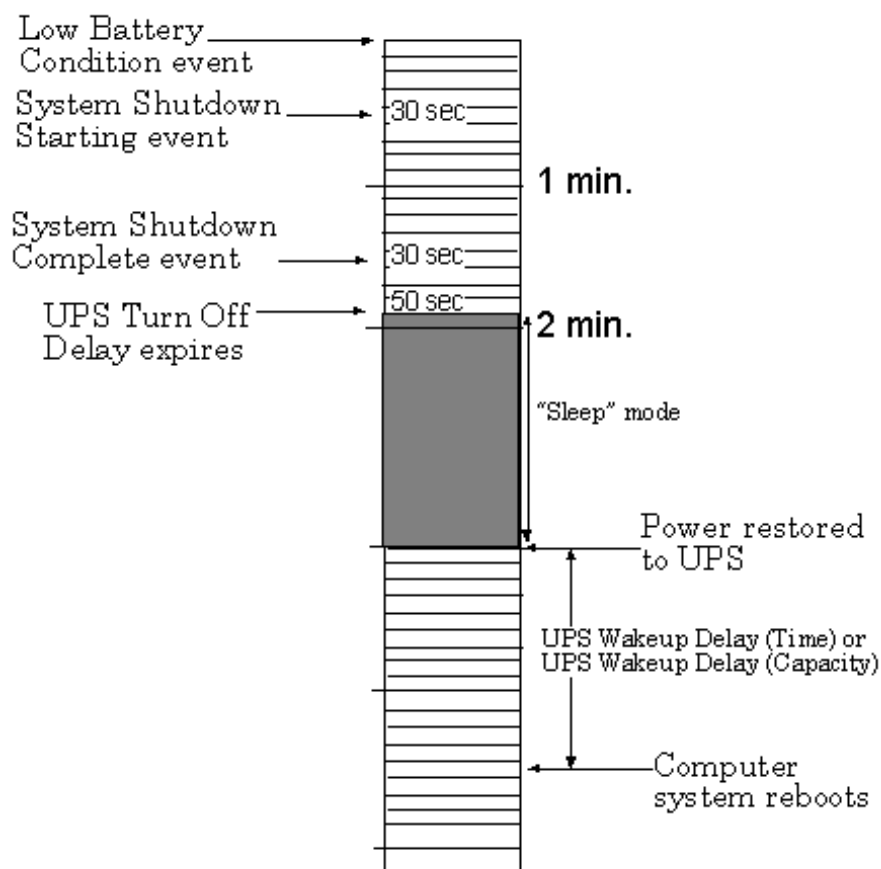
**Figure 2: Timeline of Shutdown on low battery**

# Appendix A: FlexEvents Reference

PowerChute *plus* generates events, also know as FlexEvents, for the following products manufactured by APC:

- Smart-UPS
- Matrix-UPS
- Symmetra *Power Array*
- Back-UPS
- Measure-UPS

This appendix provides FlexEvent reference information as follows:

- **Event and Popup Texts, Variables in the INI file**
- **Event Descriptions**
- **List of ID's with Severity, Event, and UPS**

For information on configuring FlexEvents, please see **Chapter 4, How to Configure FlexEvents**.

*Note:*
*For more information on the Measure-UPS, see **Appendix B, Measure-UPS and its Events***.

## Event and Popup Texts, Variables in the INI file

**Event texts** are the messages that get logged in the Event Log when an event occurs. Some events have just one associated text, others have more. For example, the **UPS Self-Test Passed** event has four associated event texts:

```
UPS self-test passed
Scheduled UPS self-test passed
User-initiated UPS self-test passed
Self-test at UPS passed
```

Each associated message pertains to a specific situation, or to put it another way, a sub-category of the event. In the example, several kinds of self-tests can generate the Self-Test event and the different text tells you which one.

**Popup texts** are notification messages sent to specified users. To use non-default messages, see **Usage of Text in Notification Messages in Chapter 4**.

The PowerChute *plus* initialization file (**powerchute.ini**) defines both event and popup texts and associates them with events. Some event texts and popup texts use variables, that is, a code name that is replaced by a value when the event text is actually displayed. These codes display in the INI file as #*variable_name*#.

- Variables allowed are discussed in **Variables in [EventText] and [PopupText] in Appendix C**.

- For general information on the initialization file and how to edit event and popup text within it, please see **Appendix C, Initialization (INI) File**

# Event Descriptions

The alphabetical list of events in this section contains a description of each event that PowerChute *plus* generates for your American Power Conversion product.

Each section, with headings listed below, includes the following information for each event:

| Event Name (given in the heading) | Description | ID code | Event Text |
|---|---|---|---|
| For example, `Administrative Shutdown`. | Tells you about the nature of the event and how and when it is generated. | Numerical identifier of the event. The first digit is the severity code.<br>See **List of ID's with Severity, Event, and UPS**. | Displayed in the **Last Two Events** window of the Main Screen and logged in the Event Log file.<br>See **Event and Popup Texts, Variables in the INI file**. |

- **Abnormal Contact Position**

- **Administrative Shutdown**

- **Ambient Temp in Range**

- **Ambient Temp Out Of Range**

- **Base Module Fan Failure**

- **Base Module Power Supply Failure**

- **Battery Added**

- **Battery Needs Replacing**

- **Bypass Contactor Failed**

- **Bypass Contactor OK**

- **Cancel Battery Calibration**

- **Check Smart Cell Signal**

- **Comm Lost While On Battery**

- **Communication Established**

- **Contact Normal**

- **Humidity In Range**

- **Humidity Out Of Range**

- **Input Circuit Breaker Reset**

- **Input Circuit Breaker Tripped**

- **Lost Communication With UPS**

- **Low Battery Condition**

- **Main Intelligence Module Added**

- **Main Intelligence Module Failed**

- **Main Intelligence Module OK**

- **Main Intelligence Module Removed**

- **Minimum Redundancy Lost**

- **Minimum Redundancy Regained**

- **Overload Condition Solved**

- **Power Restored**

- **PowerChute Started**

- **PowerChute Stopped**

- **Return From Bypass**

- **Redundant Intelligence Module Added**

- **Redundant Intelligence Module Failed**

- **Redundant Intelligence Module OK**

- **Redundant Intelligence Module Removed**

- **Shutdown Cancelled**

- **Smart Cell Signal Returned**

- **System Level Fan Failed**

- **System Level Fan OK**

- **System Shutdown Complete**

- **System Shutdown Starting**

- **UPS Battery Is Discharged**

- **UPS Battery Replaced**

- **UPS Enabling SmartBoost**

- **UPS Module Added**

- **UPS Module Failed**

- **UPS Module Removed**

- **UPS On Battery**

- **UPS On Bypass: Failure**

- **UPS On Bypass: Maintenance**

- **UPS Output Overload**

- **UPS Return From Low Battery**

- **UPS Run Time Calibration Completed**

- **UPS Run Time Calibration Initiated**

- **UPS Self-Test Failed**

- **UPS Self-Test Passed**

## Abnormal Contact Position

When PowerChute detects a change from the normal state of a Measure-UPS contact closure (such as a closure is configured as normally open and PowerChute detects it as closed), it generates the **Abnormal Contact Position** event.

The Measure-UPS accessory has four contact closure inputs that you can use to monitor the operation of security, environmental control, or fire protection equipment. You configure the state of each contact closure as either normally open or normally closed.

See also **Contact Normal**, the event generated when a contact returns to its normal state afterwards.

| ID Code | Event Text |
|---------|------------|
| 3006 | `Contact #CONTACT_NUMBER# fault (#CONTACT_POSITION#): #USER_COMMENT#` |

## Administrative Shutdown

The server or host computer is shutting down for administrative purposes. PowerChute *plus* generates this event at the start of either of the following kinds of shutdown:

- User-initiated server or system shutdown.

  You can initiate a user-initiated shutdown by selecting the **Shut Down Server Now...** option from the **System menu**.

- Scheduled server or system shutdown.

  You can schedule shutdowns by selecting the **Schedule Server Shutdown...** option from the **System Menu**.

| ID Code | Event Text |
|---------|------------|
| 1005 | `Administrative shutdown started` OR<br>`Administrative shutdown: User initiated` OR<br>`Administrative shutdown: Weekly shutdown` OR<br>`Administrative shutdown: Daily shutdown` |

## Ambient Temp in Range

This event says the ambient temperature recorded by the Measure-UPS is back within the range of the upper and lower thresholds configured through **Measure-UPS Parameters...**. It only occurs after **Ambient Temp Out Of Range**.

| ID Code | Event Text |
|---------|------------|
| 1100 | `Ambient temperature back within thresholds` |

## Ambient Temp Out Of Range

This event says the ambient temperature recorded by the Measure-UPS is above the high threshold or below the low threshold configurable through the **Measure-UPS Parameters...** option of the **Configuration** menu.

| ID Code | Event Text |
|---------|------------|
| 3100 | `Below lower ambient temperature threshold of #LOW_THRESHOLD#` OR<br>`Exceeded upper ambient temperature threshold of #HIGH_THRESHOLD#` |

## Base Module Fan Failure

This event says the Matrix-UPS senses a faulty fan in the Isolation Unit.

| ID Code | Event Text |
|---------|------------|
| 3014 | Base module fan needs repair |

## Base Module Power Supply Failure

This event says the Matrix-UPS bypass power supply is malfunctioning; the UPS is unable to go to bypass mode.

| ID Code | Event Text |
|---------|------------|
| 3015 | Base module bypass power supply needs repair |

## Battery Added

This event says a user plugged a battery into the UPS frame or into an extended run battery cabinet.

| ID Code | Event Text |
|---------|------------|
| **1033** | Battery added |

## Battery Needs Replacing

This event says that one or more UPS batteries is heavily discharged and cannot hold a full charge, i.e., a hardware issue. If utility power fails during this condition, a Matrix-UPS or Smart-UPS runs for less than half its normal run-time. A failed battery in a Symmetra *Power Array* reduces normal run-time in proportion to the number of batteries the system contains.

| ID Code | Event Text |
|---------|------------|
| 3016 | UPS battery needs replacing |

## Bypass Contactor Failed

A user attempted to put the Symmetra *Power Array* into bypass mode or take it out of bypass mode by using the manual switch, but the attempt was unsuccessful.

| ID Code | Event Text |
|---------|------------|
| **2037** | Bypass contactor failed |

## Bypass Contactor OK

The condition that caused the manual switch to fail to put the Symmetra *Power Array* into or out of bypass mode has been corrected.

| ID Code | Event Text |
|---------|------------|
| **1040** | Bypass contactor OK |

## Cancel Battery Calibration

This event says run-time calibration could not begin, was canceled, or was interrupted. The following circumstances cause the event:

- You explicitly cancel run-time calibration.

- A power anomaly, such as low voltage, high voltage, or power failure, interrupts run-time calibration.

- Run time calibration cannot start because battery capacity is less than 100%.

| ID Code | Event Text |
|---------|------------|
| 2004 | `UPS runtime calibration cancelled` OR<br>`UPS runtime calibration cancelled by user` OR<br>`UPS runtime calibration cancelled by power failure` OR<br>`UPS unable to perform runtime calibration: Capacity < 100%` |

## Check Smart Cell Signal

This event says a Matrix-UPS reports zero battery packs. (A Matrix-UPS needs battery packs to operate). The cause of this event is usually a loose cable connection between the Matrix-UPS and its battery packs.

| ID Code | Event Text |
|---------|------------|
| 3010 | `Check installation of Smart Cell signal cable` |

## Comm Lost While On Battery

This event says communication with the UPS has been lost while the UPS is on battery. PowerChute *plus* immediately begins shutting down the system. The event can result from a loose communication cable or, rarely, by a software conflict, e.g. an application blocking PowerChute from monitoring the serial port while the UPS is on battery.

| ID Code | Event Text |
|---------|------------|
| 3004 | `Communication lost while on battery` |

## Communication Established

This event says communication with the UPS is successfully established, either for the first time or after being lost.

| ID Code | Event Text |
|---------|------------|
| 1002 | `Communication established` |

## Contact Normal

PowerChute generates this event through a Measure-UPS when it detects a return from an abnormal contact position state, i.e. only after an **Abnormal Contact Position** event.

| ID Code | Event Text |
|---------|------------|
| 1010 | `Contact #CONTACT_NUMBER# normal (#NORMAL_POSITION#): #USER_COMMENT#` |

## Humidity In Range

This event says the Measure-UPS humidity is back within the upper and lower humidity threshold range, as configured through the **Measure-UPS Parameters...** option of the **Configuration** menu.

| ID Code | Event Text |
|---------|------------|
| 1101 | Ambient humidity back within thresholds |

## Humidity Out Of Range

This event says the Measure-UPS humidity is above the high threshold or below the low threshold configurable through the **Measure-UPS Parameters...** option of the **Configuration** menu.

| ID Code | Event Text |
|---------|------------|
| 3101 | Below humidity threshold of #LOW_THRESHOLD# OR <br> Exceeded upper humidity threshold of #HIGH_THRESHOLD# |

## Input Circuit Breaker Reset

A user reset the input circuit breaker after a power anomaly, such as low voltage, high voltage, or power failure caused it to trip. The UPS switched from battery power to utility power.

| ID Code | Event Text |
|---------|------------|
| **2039** | Input circuit breaker reset |

## Input Circuit Breaker Tripped

A power anomaly, such as low voltage, high voltage, or power failure caused the input circuit breaker to trip, causing the UPS to switch to battery power.

| ID Code | Event Text |
|---------|------------|
| **2038** | Input circuit breaker tripped |

## Lost Communication With UPS

This event occurs when PowerChute *plus* attempts to establish communication with the UPS and cannot, or communication that was established is lost.

| ID Code | Event Text |
|---------|------------|
| 3000 | Unable to communicate with UPS |

## Low Battery Condition

This event says the amount of UPS run-time remaining has reached the **UPS Low Battery Signal Time**. For example, configuring the UPS Low Battery Signal Time to 10 minutes causes PowerChute *plus* to initiate low battery shutdown when the UPS is on battery and only 10 minutes of run-time remain.

On Back-UPS and older Smart-UPS, set the Low Battery Signal Time using dip switches located at the back of the UPS. On Symmetra *Power Array*, newer Smart-UPS, and Matrix-UPS, set the Low Battery Signal Time by using the **UPS Shutdown Parameters...** option in the **Configuration** menu.

| ID Code | Event Text |
|---------|-----------|
| 2003 | Low battery condition OR<br>Low battery condition: #BATTERY_CAPACITY# |

## Power Restored

This event says that the UPS has returned to AC utility power after being on battery power due to a power failure.

| ID Code | Event Text |
|---------|-----------|
| 1003 | Normal power restored: UPS on line |

## PowerChute Started

This event says the PowerChute *plus* monitoring of the UPS has started.

| ID Code | Event Text |
|---------|-----------|
| 1000 | *** PowerChute *plus* Version *version_number* started *** |

## PowerChute Stopped

This event says the PowerChute *plus* UPS monitoring has stopped because the PowerChute daemon (the background process) has been killed.

| ID Code | Event Text |
|---------|-----------|
| 1001 | *** PowerChute *plus* stopped *** |

## Return From Bypass

This only applies to the Matrix-UPS. In bypass mode, the Matrix-UPS acts only as a voltage regulator; the batteries themselves are bypassed. This event indicates the situation has been remedied. (See **UPS On Bypass: Failure** and **UPS On Bypass: Maintenance** events for more information on bypass mode.)

| ID Code | Event Text |
|---------|-----------|
| 1017 | UPS returned from bypass |

## Shutdown Cancelled

This event says a user cancelled a shutdown (using System/**Cancel Server Shutdown**) whether scheduled through a) the **Schedule Server Shutdown...** option in the System menu or b) the **Schedule UPS Tests...** option of the **Diagnostics** menu, or manually initiated with the **Shut Down Server Now...** option in the **System** menu.

*Note that **Shut Down Server Now** toggles to **Cancel Server Shutdown**.*

| ID Code | Event Text |
|---------|-----------|
| 1006 | Shutdown cancelled |

## Smart Cell Signal Returned

This event says that the cause of the generation of the **Check Smart Cell Signal** event is resolved, and the Matrix-UPS is connected with its battery packs (Smart Cells).

| ID Code | Event Text |
|---------|------------|
| 1018 | Smart Cell signal restored |

## System Level Fan Failed

The system level fan is not operating properly

| ID Code | Event Text |
|---------|------------|
| 2036 | System level fan failed |

## System Level Fan OK

The cause of the system level fan failure has been corrected.

| ID Code | Event Text |
|---------|------------|
| 1039 | System level fan OK |

## System Shutdown Complete

This event says that all shutdown processing is complete, and the system is shutting down.

| ID Code | Event Text |
|---------|------------|
| 2001 | System shutdown |

## System Shutdown Starting

This event says that the system is shutting down because an event occurred triggering the **Shut Down Server** action. For more information, see **Chapter 4, How to Configure FlexEvents**.

| ID Code | Event Text |
|---------|------------|
| 1016 | Shutdown started |

## UPS Battery Is Discharged

This event says that the UPS is not actually supplying battery power, but its battery capacity is low. If power fails, PowerChute *plus* shuts down the system immediately.

| ID Code | Event Text |
|---------|------------|
| 3003 | UPS battery is discharged OR<br>UPS battery is discharged: #BATTERY_CAPACITY# |

## UPS Battery Replaced

This event says that a depleted UPS battery or a whole UPS was replaced. This event is generated only when the UPS returns from the **Battery Needs Replacing** event.

COMMENT: IS THE PRECEDING SENTENCE TRUE FOR Symmetra?

| ID Code | Event Text |
|---------|------------|
| 1009 | UPS batteries no longer need replacing |

## UPS Enabling SmartBoost

This event says that the Smart-UPS activated its brownout correction feature, SmartBoost. This maintains adequate voltage supplied to attached equipment during times of low utility line voltage without switching to battery power.

| ID Code | Event Text |
|---------|------------|
| 2002 | UPS enabling SmartBoost |

## UPS Module Added

A UPS Module has been added to the UPS frame or to an extended run cabinet.

| ID Code | Event Text |
|---------|------------|
| 1031 | UPS module added |

## UPS Module Failed

A UPS module within the UPS system failed.

| ID Code | Event Text |
|---------|------------|
| :2031 | UPS module failed |

## UPS Module Removed

A UPS module has been removed from the UPS system.

| ID Code | Event Text |
|---------|------------|
| 1032 | UPS module removed |

## UPS On Battery

This event says that the UPS has switched to battery power due to one of the following situations:

- High input line voltage: The current line voltage is greater than the voltage limit set as the **High Transfer Point**. You set this parameter with the **UPS Operating Parameters...** option.

- Low input line voltage: Due to a temporary but severe reduction of line voltage (such as a brownout), the current input line voltage is lower than the low voltage limit set as the **Low Transfer Point.** You also set this parameter with the **UPS Operating Parameters...** option..

- Blackout: The UPS is receiving no AC power.

- Small, deep, or large momentary power sag.

- Small or large momentary power spike.

- Simulated power failure: You selected the **Simulate Power Failure** menu item from the **Diagnostics** menu.

See the ID code and the actual event text in the table following:

| ID Code | Event Text |
|---------|------------|
| 2000 | UPS on battery OR<br>UPS on battery: High input line voltage #MAX_VOLTAGE# V OR<br>UPS on battery: Brownout #MIN_VOLTAGE# V OR<br>UPS on battery: Blackout #MIN_VOLTAGE# V OR<br>UPS on battery: Small momentary sag #MIN_VOLTAGE# V OR<br>UPS on battery: Deep momentary sag #MIN_VOLTAGE# V OR<br>UPS on battery: Small momentary spike #MAX_VOLTAGE# V OR<br>UPS on battery: Large momentary spike #MAX_VOLTAGE# V OR<br>UPS on battery: Simulated power failure |

## UPS On Bypass: Failure

This event says that your Matrix-UPS or Symmetra *Power Array* batteries have been bypassed, and the UPS is serving only as a voltage regulator. Contact **Technical Support** if this condition exists.

Any of the following conditions cause your UPS to go into bypass mode:

- Internal temperature is over the limit

- Battery charger failure: it probably needs repair.

- Severe DC imbalance overload: The Matrix-UPS inverter needs repair.

- Output voltage outside safe limits

- Top module fan needs repair.

| ID Code | Event Text |
|---------|------------|
| 3013 | UPS on bypass: internal temp over limit OR<br>UPS on bypass: battery charger failure OR<br>UPS on bypass: severe DC imbalance overload OR<br>UPS on bypass: output voltage outside limits OR<br>UPS on bypass: top module fan needs repair |

## UPS On Bypass: Maintenance

This event says that your Matrix-UPS or Symmetra *Power Array* or Symmetra *Power Array* is in Bypass Maintenance mode, caused by:

- Using the manual switch. On a Matrix-UPS, this switch is at the rear of the UPS On a Symmetra *Power Array*, this switch is on the front of the frame, at the bottom.

- Using the Matrix-UPS front panel

- Selecting the **Put UPS on Bypass** option in the PowerChute *plus* **Diagnostics** menu

| ID Code | Event Text |
|---------|-----------|
| 2013 | `UPS on bypass: user set via software`or panel OR<br>`UPS on bypass: user set via switch` |

## UPS Output Overload

This event says that for a Matrix-UPS, Symmetra *Power Array*, or Smart-UPS, the equipment load on the UPS exceeds its rated load capacity. Reduce the load by unplugging some equipment from the UPS, and then run a self-test.

| ID Code | Event Text |
|---------|-----------|
| 3001 | `UPS output overload` |

## Main Intelligence Module Added

A main intelligence module has been inserted to replace the one that was removed.

*Note:*
*When you insert a new Main Intelligence Module, communication with your Symmetra Power Array is briefly lost while the Main Intelligence Module initializes. Therefore, PowerChute generates a sequence of events: Main Intelligence Module Added, Communication Established, and Main Intelligence Module OK.*

| ID Code | Event Text |
|---------|-----------|
| 1036 | `Main intelligence module added` |

## Main Intelligence Module Failed

A component failure caused the main intelligence module to fail. PowerChute generates this event only if a redundant intelligence module is installed. If no redundant intelligence module is installed, PowerChute is unable to determine the cause of the communication failure and generates a **Lost Communication With UPS** event instead.

| ID Code | Event Text |
|---------|-----------|
| 2033 | `Main intelligence module failed` |

## Main Intelligence Module OK

The main intelligence module is functioning properly.

*Note:*
*When you insert a new main intelligence module, communication with your Symmetra Power Array is briefly lost while the main intelligence module initializes. Therefore, PowerChute generates a sequence of events: Main Intelligence Module Added, Lost Communication With UPS, Communication Established, and Main Intelligence Module OK.*

| ID Code | Event Text |
|---------|-----------|
| 1035 | `Main intelligence module OK` |

## Main Intelligence Module Removed

The main intelligence module has been removed.

| ID Code | Event Text |
|---------|-----------|
| 2032 | `Main intelligence module removed` |

## Minimum Redundancy Lost

The redundancy is below the minimum acceptable redundancy displayed by choosing the **Fault Tolerant Data** option of the **Configuration** menu. Either the number of functioning UPS modules decreased (by failure or removal of a UPS module) or the equipment load supported by the UPS increased. If a UPS module failed or was removed, replace it. If the equipment load on the UPS increased, either add one or more additional UPS Modules to support the increased load, or reduce the load.

| ID Code | Event Text |
|---------|-----------|
| 2030 | `Minimum redundancy lost` |

## Minimum Redundancy Regained

The redundancy is at or above the minimum acceptable redundancy specified through the **Fault Tolerant Data** option of the **Configuration** menu. A failed UPS module was replaced, one or more UPS modules were added to support an increased load, or the load on the UPS was decreased.

| ID Code | Event Text |
|---------|-----------|
| 1030 | `Minimum redundancy regained` |

## Overload Condition Solved

This event says the load on the UPS has been decreased, or (for a Symmetra *Power Array* only) the number of non-redundant UPS Modules has been increasedresulting in the UPS no longer being in an overload condition.

| ID Code | Event Text |
|---------|-----------|
| 1013 | `UPS overload condition solved` |

## Return From Bypass

This event says that the Matrix-UPS has returned from bypass mode. (See **UPS On Bypass: Failure** and **UPS On Bypass: Maintenance** events for more information on bypass mode.)

| ID Code | Event Text |
|---------|-----------|
| 1017 | `UPS returned from bypass` |

## Redundant Intelligence Module Added

The redundant intelligence module has been inserted, either as a new component of your UPS system, or inserted after the existing redundant intelligence module failed or was removed.

| ID Code | Event Text |
|---------|------------|
| 1038 | Redundant intelligence module added. |

## Redundant Intelligence Module Failed

A component failure caused the redundant intelligence module to fail.

| ID Code | Event Text |
|---------|------------|
| 2035 | Redundant intelligence module failed |

## Redundant Intelligence Module OK

The redundant intelligence module that has been inserted is functioning properly.

| ID Code | Event Text |
|---------|------------|
| 1037 | Redundant intelligence module OK |

## Redundant Intelligence Module Removed

The redundant intelligence module has been removed.

| ID Code | Event Text |
|---------|------------|
| 2034 | Redundant intelligence module removed. |

## UPS Return From Low Battery

This event says the UPS has recharged its battery or batteries sufficiently to return from a low battery condition.

| ID Code | Event Text |
|---------|------------|
| 1007 | UPS returned from low battery condition OR<br>UPS returned from low battery condition: #BATTERY_CAPACITY# |

## UPS Run Time Calibration Completed

This event says run-time calibration has been completed.

| ID Code | Event Text |
|---------|------------|
| 1015 | UPS runtime calibration completed |

## UPS Run Time Calibration Initiated

This event says a user-initiated or scheduled run-time calibration started. Calibration determines the UPS battery run-time.

| ID Code | Event Text |
|---------|-----------|
| 1014 | UPS runtime calibration initiated |

## UPS Self-Test Failed

This event says that the UPS failed a self-test for one of the following reasons.

- Bad Battery: the battery is discharged or defective. Allow the UPS to recharge for several hours and then retest the UPS.

  Invalid Test: The UPS is not in a condition to complete a meaningful test — for example, when the load is greater than 105% of battery capacity.  or, for a Symmetra *Power Array*, in any of the following cases:

  - A UPS Module has failed.

  - A self-test is attempted when no batteries are installed.

  - The Symmetra *Power Array* is in Bypass mode

  - The Symmetra *Power Array* is in the midst of a runtime calibration or simulated power failure.

- For an overload condition, unplug some equipment that is not in use, and try the self-test again.

  If the situation persists, contact **Technical Support**.

| ID Code | Event Text |
|---------|-----------|
| 3002 | UPS self-test failed OR<br>Scheduled UPS self-test failed: Bad battery OR<br>Scheduled UPS self-test failed: Invalid test OR<br>User-initiated self-test failed: Bad battery OR<br>User-initiated self-test failed: Invalid test OR<br>Self-test at UPS failed: Bad battery OR<br>Self-test at UPS failed: Invalid test |

## UPS Self-Test Passed

This event says that the UPS passed its self-test.

| ID Code | Event Text |
|---------|-----------|
| 1004 | UPS self-test passed OR<br>Scheduled UPS self-test passed OR<br>User-initiated UPS self-test passed OR<br>Self-test at UPS passed |

## List of ID's with Severity, Event, and UPS

The following table lists all FlexEvents, sorted by the first four digits of their ID Codes, and showing the severity level, and the UPS products to which they apply. **Severity Codes** are explained following the table.

*Note: ID codes never display in any log file though you can refer to them in the Page dialog box (see* **How to Page Users***). You can view them in the INI file; see* **Appendix C, Initialization (INI) File***.*

| ID Code | FlexEvent Name | Measure-UPS | Matrix-UPS | Symmetra *Power Array* | Smart-UPS | Back-UPS |
|---|---|---|---|---|---|---|
| 1000 | PowerChute Started | - | X | X | X | X |
| 1001 | PowerChute Stopped | - | X | X | X | X |
| 1002 | Communication Established | - | X | X | X | X |
| 1003 | Power Restored | - | X | X | X | X |
| 1004 | UPS Self-Test Passed | - | X | X | X | - |
| 1005 | Administrative Shutdown | - | X | X | X | - |
| 1006 | Shutdown Cancelled | - | X | X | X | - |
| 1007 | UPS Return From Low Battery | - | X | X | X | - |
| 1009 | UPS Battery Replaced | - | X | X | X | - |
| 1010 | Contact Normal | X | - | - | - | - |
| 1013 | UPS Overload Condition Solved | - | X | X | X | - |
| 1014 | UPS Run Time Calibration Initiated | - | X | X | X | - |
| 1015 | UPS Run Time Calibration Completed | - | X | X | X | - |
| 1016 | System Shutdown Starting | - | X | X | X | X |
| 1017 | Return From Bypass | - | X | X | - | - |
| 1018 | Smart Cell signal returned | - | X | X | - | - |
| 1100 | Ambient Temp In Range | X | - | - | - | - |
| 1101 | Humidity In Range | X | - | - | - | - |
| 2000 | UPS On Battery | - | X | X | X | X |
| 2001 | System Shutdown Complete | - | X | X | X | X |
| 2002 | UPS Enabling Smart Boost | - | - | - | X | - |
| 2003 | Low Battery Condition | - | X | X | X | X |
| 2004 | Cancel Battery Calibration | - | X | X | X | - |
| 2013 | UPS On Bypass: Maintenance | - | X | X | - | - |
| 3000 | Lost Communication with UPS | - | X | X | X | - |

| ID Code | FlexEvent Name | Measure-UPS | Matrix-UPS | Symmetra *Power Array* | Smart-UPS | Back-UPS |
|---|---|---|---|---|---|---|
| 3001 | UPS Output Overload | - | X | X | X | - |
| 3002 | UPS Self-Test Failed | - | X | X | X | - |
| 3003 | UPS Battery Is Discharged | - | X | X | X | - |
| 3004 | Comm Lost While On Battery | - | X | X | X | - |
| 3006 | Abnormal Contact Position | X | - | - | - | - |
| 3010 | Check Smart Cell Signal | - | X | X | - | - |
| 3013 | UPS On Bypass: Failure | - | X | X | - | - |
| 3014 | Base Module Fan Failure | - | X | X | - | - |
| 3015 | Base Module Power Supply Failure | - | X | X | - | - |
| 3016 | UPS Battery Needs Replacing | - | X | X | X | - |
| 3100 | Ambient Temp Out Of Range | X | - | - | - | - |
| 3101 | Humidity Out Of Range | X | - | - | - | - |

## Severity Codes

The first digit of the FlexEvent ID code tells you the severity of the event. For example, 3014 has a severity of 3. The table below explains the three possibilities:

| | | |
|---|---|---|
| 3 | **Severe problem** requiring your immediate attention. | |
| | Unless resolved, most severity code 3 events cause incorrect operation of the UPS, the equipment connected to the UPS, or the PowerChute *plus* software, or cause loss of UPS protection during a power failure. | |
| 2 | **Warning** indicating serious conditions that cause PowerChute *plus* to take protective action. | |
| | You generally need to address the cause of a severity 2 event to prevent conditions from worsening, but the need is not immediate. | |
| | For example, when PowerChute *plus* generates the severity 2 **Low Battery Condition** event, you have a limited amount of battery run-time remaining | |
| 1 | **Informational message** providing status information concerning UPS operation, including notification of a return from abnormal conditions. | |

# Appendix B:  Measure-UPS and its Events

The Measure-UPS device—whether an external, stand-alone Measure-UPS or a SmartSlot Measure-UPS II—is an accessory to your UPS that monitors both environmental conditions and physical access to your computer system.

PowerChute *plus* generates FlexEvents when a Measure-UPS reports non-normal conditions, e.g. temperature is too high. You can configure your system so that these events in turn initiate activity, for example, sending messages to system users or actually shutting down the system.

This appendix describes PowerChute *plus* support for the two APC Measure-UPS accessories. The information is provided in three sections:

- **Measure-UPS Capabilities**

- **PowerChute plus and Measure-UPS Devices**

- **Events relating to the Measure-UPS**

# Measure-UPS Capabilities

The Measure-UPS has the capability to communicate this information to PowerChute *plus:*

- it monitors smoke, heat, and humidity in the environment

- it uses a probe to monitor conditions up to twelve feet from the UPS or Measure-UPS

- it uses four sets of contacts in sensor zones on the Measure-UPS which can be set up to monitor, for example, door closures or motion devices in order to prevent unauthorized access to the computer equipment

# PowerChute *plus* and Measure-UPS Devices

If a Measure-UPS device is attached to your system, it has two effects on PowerChute *plus*:

1. Ambient temperature and humidity data displays in the Data Fields window of the Main Screen.

   If either is outside the range established by the low and high thresholds in the Measure-UPS Parameters dialog box, the data on the Main Screen is displayed in red.

2. The **Measure-UPS Parameters...** option in the **Configuration** menu is enabled. Selecting it displays the following dialog box:



Use this dialog box to configure temperature and humidity thresholds, the normal state of contact closure points, and a brief description of each closure point being monitored.

See **Measure-UPS Parameters... in Chapter 3** for more information on configuring these parameters.

## Events relating to the Measure-UPS

When the Measure-UPS device generates an event, it registers in the **Last Two Events** window of the Main Screen and also gets logged in the Event Log file. In other words, these events are treated the same as all other events by PowerChute *plus*.

The table following shows the events generated by temperature and humidity deviating from the ranges defined through the **Measure-UPS Parameters...** option.

| When this happens... | ...this Event is generated |
| --- | --- |
| The environmental temperature goes out-of-range | **Ambient Temp Out Of Range** |
| The humidity goes out-of-range | **Humidity Out Of Range** |
| Temperature returns within range | **Ambient Temp in Range** |
| Humidity returns within range | **Humidity In Range** |
| A contact closure is no longer in its normal configuration of open or closed | **Abnormal Contact Position** |
| A contact closure previously reported as abnormal returns to its normal configuration, open or closed | **Contact Normal** |

You can configure any of these events to initiate any of seven possible actions, including shutting down the server or system, notifying administrators or users, or running a command file.

For information on configuring these events and actions, see **Chapter 4, How to Configure FlexEvents**.

# Appendix C: Initialization (INI) File

When PowerChute *plus* starts up, it first reads the initialization file **powerchute.ini** which contains information on the local configuration of the UPS/PowerChute *plus* system. This tells it, for example, whether a Measure-UPS is attached to the UPS, whether error logging is enabled or not, etc.

When you set parameters in PowerChute *plus*, this file is automatically updated. But you can also directly modify the file using any text editor that saves your changes in standard ASCII format.

This appendix describes how to edit your PowerChute *plus* initialization file to configure parameters that you cannot configure through the menus and dialog boxes of the User Interface Module.

Please see the following sections:

- **Formatting of Elements in the INI File**

- **Initialization File Settings**

- **Variables in [EventText] and [PopupText]**


*Caution:*
*Before you edit the initialization file, save a backup copy with a different file name. APC recommends that, whenever possible, you make initialization file changes through the PowerChute plus menus and dialog boxes.*

## Formatting of Elements in the INI File

The initialization file elements consist of headings, called keywords, and one or more related parameter values. The keyword and parameters appear in the format shown directly below, with an example, `Devices`, on right:

```
[keyword]              [Devices]

parameter=value        MeasureUps=Yes
```

The following table provides element descriptions and rules on using them:

| Element | Description and Rules |
|---------|----------------------|
| **Keyword** | The heading name of a section, enclosed in brackets, representing a PowerChute feature/ function. <br> • Make sure that a keyword does not already exist in your **.ini** file before adding it. <br> • Place keywords in any order within the initialization file. <br> • Enter keywords exactly as shown in this appendix, including the case (upper or lower). <br> • Enclose keywords in square brackets `[ ]`. <br> • Do not include any spaces in a keyword. |
| **Parameter** | Labels and identifies a value. <br> • Place parameters in any order below the keyword to which they apply. <br> • Do not include any spaces in a parameter. <br> • Enter parameters exactly as shown in this appendix, including the case (upper or lower). |
| **Value** | A variable, usually limited to a given set of values, but in some cases user-defined. <br> • When entering multiple values for the same parameter, separate the values with commas but no spaces. <br> • Use no spaces at the end of the line. <br> • Enter system-defined values exactly as shown in this appendix, including the case (upper or lower). <br> • User-defined values cannot contain the number sign character # except to enclose the names of standard PowerChute *plus* variables, as described in **Variables in [EventText] and [PopupText]**. |

# Initialization File Settings

This section describes parameters in the following keyword sections. The first four sections are present in the INI file by default; the UPS section is not.

- **[Devices]**
- **[ErrorLogging]**
- **[EventText]**
- **[PopupText]**
- **[UPS]**

*Note:*
*All other parameter values can be set through the* PowerChute *plus user interface. Please note that your initialization file may not have every .***ini** *file section, parameter, and value documented in this appendix.*

## [Devices]

If your Measure-UPS or Smart Slot Measure-UPS II is not recording data or the Measure-UPS values are not displayed on the Main Screen, check this section of the INI to be sure that the `MeasureUps` parameter value is `Yes`.

`[Devices]`

| | |
|---|---|
| `MeasureUps=Yes` | Allowed values are `Yes` and `No`. |
| | If you set this value to `No`, PowerChute *plus* does not display Measure-UPS data on the Main Screen or log Measure-UPS data in the Data Log. |

## [ErrorLogging]

This section of the INI enables or disables error logging and sets the name and maximum size of the Error Log. You can *only* configure the parameters in this section through the initialization file. In addition, you cannot view the Error Log through the PowerChute *plus* user interface, only directly through the UNIX terminal window.

`[ErrorLogging]`

| | |
|---|---|
| `ErrorLogEnabled=Yes` | Allowed values are `Yes` or `No`. `No` disables error logging. |
| `ErrorLogName=` `e:\pwrchute\powrchute.err` for UNIX | The drive, path and file name for the error log file. On UNIX platforms, the default file name is **powerchute.err.** |
| `ErrorLogMaxSize=50000` | Maximum size in bytes for the error log file. |

## [EventText]

This section of the INI contains the event text, also know as the message text, for each FlexEvent. PowerChute *plus* uses a FlexEvent's event text to log the event in the Event Log file and display it in the **Last Two Events Window** on the Main Screen.

The first digit of the six-digit code at the beginning of each line indicates the severity of the event. The first four digits identify the event category while the last two digits identify sub-categories of the event. (Please see **List of ID's with Severity, Event, and UPS in Appendix A** for more background information on categories and severity).

> Example:
>
> 3100 identifies the event **Ambient Temp Out Of Range**; this event has two sub-categories, covering events below and above the temperature thresholds.
>
> These sub-categories are identified by 01 and 02, giving a complete ID of 310001 and 310002 respectively. .

See your actual PowerChute *plus* initialization file for a complete list of event texts. An example list is shown here.

*Note that words inside the hash symbol, #, are variables. Please see* **Variables in [EventText] and [PopupText]***.*

```
[EventText]
100000=*** PowerChute plus Version version number Started ***
100100=*** PowerChute plus  Stopped ***
.
.
.
200000=UPS on battery
200001=UPS on battery: High input line voltage #MAX_VOLTAGE# V
.
.
.
300000=Unable to communicate with UPS
300100=UPS output overload
```

See **How to Notify Users** and **How to Notify Administrators in Chapter 4** for alternative ways to change the text logged.

For information on using languages other than English, see **Appendix E, How to Select a Language for Event Text**.

## [PopupText]

This section of the INI contains the default notification message text that PowerChute *plus* uses in notifying administrators and users when one of nine particular FlexEvents occur. They are listed by ID code below. Note that when an event occurs, PowerChute *plus* does not log this popup text in the Event Log, it logs the text present in the [EventText] section.

The first digit of the four-digit code at the beginning of each line indicates the severity of the event. The first four digits together identify the event category. (Please see **List of ID's with Severity, Event, and UPS in Chapter** for more background information on categories and severity).

On UNIX systems, notification messages are really broadcast messages to terminal windows not popups.

*Note:*
*Words inside the hash symbol, #, are variables. Please see* **Variables in [EventText] and [PopupText]***.*

```
[PopupText]
1003=Normal utility power at #HOSTNAME# has been restored.
```

```
1006=Shutdown of #HOSTNAME# has been cancelled.

1007=UPS batteries at #HOSTNAME# are no longer discharged.

1016=Shutdown process started.

2000=#HOSTNAME# is running on battery power.

2001=#HOSTNAME# has been shutdown.

2003=Low battery power at #HOSTNAME#.

3000=#HOSTNAME# has lost communications with the UPS.

3003=UPS batteries at #HOSTNAME# are discharged.
```

See **How to Notify Users** and **How to Notify Administrators in Chapter 4** for alternative ways to change the text logged.

For information on translating text to other languages, see **Appendix E, How to Select a Language for Event Text**.

## [UPS]

This section of the INI contains the `UpsPollInterval` parameter, which controls how frequently PowerChute *plus* retrieves and reads data values about the UPS.

```
[UPS]
```

`UpsPollInterval=4`       The time interval (in seconds) between PowerChute *plus* queries to the UPS for information.

The default and lowest allowed value is 4 seconds. Increase this value if you are using UPS Accessory devices (such as Measure-UPS, SNMP Adapter, or Interface Expander), and if PowerChute *plus* is unable to establish communication with the UPS.

# Variables in [EventText] and [PopupText]

Some event texts and popup texts use variables, that is, a code name that is replaced by a value when the event text is actually logged or displayed. They read in the INI file as #*variable_name*#.

The following table specifies the variables PowerChute *plus* uses in event or popup texts. View examples of their usage in the **[EventText]** and **[PopupText]** sections of the PowerChute *plus* initialization file.

| Variable | Description |
|---|---|
| #BATTERY_CAPACITY# | The battery capacity remaining |
| #CONTACT_NUMBER# | The Measure-UPS contact number |
| #CONTACT_POSITION# | The position of a Measure-UPS contact: Open or Closed |
| #HIGH_THRESHOLD# | The value of the high threshold |
| #HOSTNAME# | The name of the server or host computer |
| #LOW_THRESHOLD# | The value of the low threshold |
| #MAX_VOLTAGE# | The maximum reported voltage |
| #MIN_VOLTAGE# | The minimum reported voltage |
| #NORMAL_POSITION# | The normal operating position for the Measure-UPS contact |
| #USER_COMMENT# | The user-defined description for the Measure-UPS contact See **Contacts in Chapter 3** for more details. |

# Appendix D:  Graphing the Data Log

It's possible to import the PowerChute *plus* Data Log file into spreadsheet/graphing programs such as Microsoft Excel and Lotus 1-2-3 to graph the collected data.

This appendix describes how to do this in these sections:

- **Data Fields in the Data Log File**

- **Graphing with Microsoft Excel**

The default name for the Data Log file is **powerchute.dat**.

# Data Fields in the Data Log File

The Data Log file is an ASCII file containing lines of data in comma-delimited format, i.e., each data field is separated from the next by a comma. Each line in the Data Log file is a data record containing from 8 to 11 data fields.

The following is a typical single record from a Data Log file.

```
11/04/96,11:46:00,119.0,120.2,119.0,27.40,60.00,033.2,033.7,28.81,015.1
```

In this example, the Data Log values and the meaning of the data fields, numbered from left to right, are as follows:

| | | |
|---|---|---|
| 1 | 11/04/96 | date |
| 2 | 11:46:00 | time |
| 3 | 119.0 | minimum utility line voltage for the recording interval |
| 4 | 120.2 | maximum utility line voltage for the recording interval |
| 5 | 119.0 | output voltage of the UPS |
| 6 | 27.40 | current battery voltage |
| 7 | 60.00 | UPS output frequency |
| 8 | 033.2 | percentage of UPS rated load placed on the UPS during the period |
| 9 | 033.7 | UPS internal temperature in degrees Celsius |
| 10 | 28.81 | ambient environmental temperature in Celsius (with Measure-UPS only) |
| 11 | 015.1 | relative humidity (with Measure-UPS only) |

The values in the 9th field report on internal temperature, assuming your UPS is a model that supports this. The 10th and 11th fields report on environmental temperature and humidity and only register if a Measure-UPS accessory is attached to the UPS.

If you don't have a UPS model that supports internal temperature or a Measure-UPS, then your Data Log file line ends at the 8th field.

## Graphing with Microsoft Excel

To graph the Data Log file with Microsoft Excel, versions 5.0 through 7.0 (also known as Excel 97), perform the following steps. The procedure to graph the Data Log file with Lotus 1-2-3 is similar to the procedure you use with Microsoft Excel.

1. Copy the Data Log file, **powerchute.dat**, to a Windows environment

2. Start Microsoft Excel, and from the **File** menu, select **Open**.

3. In the Open dialog box, do the following:

   a. Go to the directory where you placed the Data Log file.

   b. Select `Text Files (*prn;*.txt; *.csv)` in the **List Files of Type:** list box.

   c. In the **File Name:** field, enter `*.DAT` and press Enter. The Data Log file name appears in the files list box.

   d. Double click on the Data Log file name in the files list box.

4. In the Text Import Wizard series of dialog boxes, do the following:

   a. In the Step 1 of 3 dialog box, click on the **Delimited** radio button in the Original Data Type section. Then click on the **Next>** button.

   b. In the Step 2 of 3 dialog box, in the "Delimiters" section, click on the **Tab** box to uncheck it, and click on the **Comma** box to check it, since the format of the Data Log file is comma-delimited.

   c. Then click on the **Finish** button, not the **Next>** button, since no further changes are needed.

5. Use the ChartWizard tool to create a graph of any data series.

The following Minimum Line Voltage graph for a 31 hour period shows a power failure between hours 8 and 11. Graphs of this type can help you analyze a site's power quality.
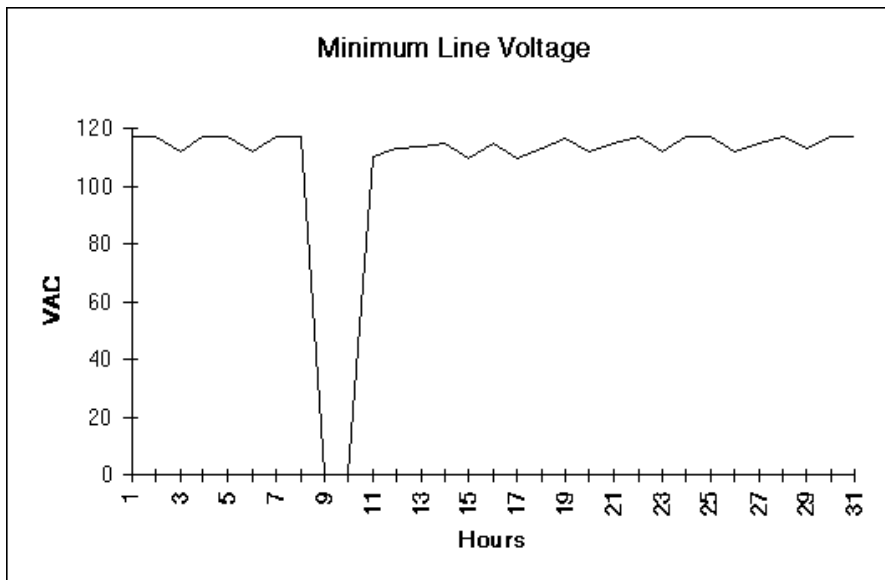


Another way to retrieve a comma-delimited file (using either Microsoft Excel or Lotus 1-2-3) is to "parse" the data. For more information on parsing and graphing data, see your Excel or Lotus 1-2-3 documentation.

# Appendix E: How to Select a Language for Event Text

You can customize PowerChute *plus* so that event text and popup text (workstation notification messages) display in any four languages other than the default, English.

Event text is the text PowerChute *plus* logs in the Event Log file and displays in the **Last Two Events** window of the Main Screen when an event occurs. Popup message text is the text that PowerChute *plus* sends in notification messages triggered by the **Notify Administrators** or **Notify Users** actions. For the background on triggering these actions, please see **Chapter 4, How to Configure FlexEvents**.

To replace the default English messages with messages in the language of your choice, perform the following steps.

1.  Have your PowerChute *plus* installation CD-ROM and an ASCII text editor available for obtaining the language file of your choice and inserting it into your PowerChute *plus* initialization file.

    (If you installed the latest release of PowerChute *plus* from software you downloaded from APC's Web site instead of from a CD-ROM, obtain the language message file you need in **Step 3b** from that Web site.)

2.  In your PowerChute *plus* installation directory, make a backup copy of the PowerChute *plus* initialization file, **powerchute.ini**. Name the backup copy as **powerchute.old**.

3.  Use an ASCII text editor to replace the `[EventText]` and `[PopupText]` sections of the initialization file with the language file of your choice:

    a.  In the initialization file, delete the entire `[EventText]` and `[PopupText]` sections, including the section heading `[EventText]` and ending with the final line in the `[PopupText]` section, which reads as follows:

        `3003=UPS batteries at #HOSTNAME# are discharged`

        **Do not** delete the section heading `[FlexEventNames]` or any of the lines following it. The `[FlexEventNames]` section immediately follows the `[PopupText]` section.

    b.  In place of the sections you just deleted, insert the entire contents of one of the following files from the **languages** subdirectory on your installation CD-ROM or from the APC's Worldwide Web site, `http://www.apcc.com`. The file names identify the language of the messages in these files.

        **french.txt**

        **german.txt**

        **italian.txt**

        **spanish.txt**

    c.  Save the edited file as **powerchute.ini**, and exit from the text editor.

4.  If it's already running, exit and restart the PowerChute *plus* daemon.

If PowerChute *plus* does not restart correctly, or if the customized event and workstation message text does not function properly, you may have made an editing error that damaged the **powerchute.ini** file. Use the file **powerchute.old** that you created in **Step 2** to recreate a correct **powerchute.ini** file by doing a save as.

# Glossary

### 3rd-Party Plug-in

An interface or program that integrates APC's software with the software of another manufacturer.

### Architecture (Network Architecture)

A communications system design containing interrelated components that can operate together or independently within a network.

### AC (Alternating Current)

Electricity originating from a utility power company which one usually accesses from a wall socket. It reverses direction at regular intervals. In North America, utility voltage changes direction 60 times per second; in Europe, 50 times per second. See Frequency.

### Ambient Temperature

The current air temperature registered by the Measure-UPS.

### Application

A computer program that performs work for the user and is not part of the operating system.

### ASCII (American Standard Code for Information Interchange)

A system of binary codes used to communicate text characters, such as letters and numbers, and control characters, such as tabs and linefeeds.

### BackOffice

A suite of servers and products, designed by Microsoft Corporation for network use.

### Back-up

A copy of an original file, disk or program, made to ensure the information will be available if the original becomes unusable.

### Battery Capacity

The total power the battery is able to provide to the UPS, which is reported by PowerChute *plus* as a percentage of full capacity.

### Battery Volts

The battery voltage, measured in VDC (Voltage Direct Current), the UPS has available.

### Browser

A specialized program that provides access to hypertext data and Web sites.

## Cell

The intersection of a column and a row on a spreadsheet or a grid.

## Check Box

An on-screen square in which you click to select or deselect an option.

## Click

To depress a mouse button.

## Client

A personal computer, terminal or workstation which uses the services of a shared-network resource (a server).

## COM Port (Communications Port)

A connector on a computer to which you attach a cable to communicate with another machine or device.

## Command File

A file used to execute specific commands or functions.

## Configuration

The settings which define how a machine or application will perform.

## Contacts

Two-position (on or off) switches used by the Measure-UPS to monitor various conditions, including doors or windows being opened or closed, or a fire alarm reacting to a fire.

## CPIO

Copy in/out: a UNIX utility that copies files in or out of file archives.

## Cursor

An on-screen symbol indicating the current point of action.

## Data Log

A file containing power and environmental information generated by an APC smart-signalling UPS, and a Measure-UPS device.

## DC (Direct Current)

Electricity that moves through a circuit in one direction only. Batteries use DC.

## Default

When an action, command, parameter or setting has more than one selectable value, the default is the value applied when the user has not selected any other allowed values.

## Dialog Box

A window that enables a user to change optional values, or otherwise directly affect the operation of a machine or application.

## Directory

See Folder.

## DMI (Desktop Management Interface)

Intel's management system for personal computers.

## Drop-down List

A list of options or menus (displayed below a selected item) which disappears after a selection is made. See Popup Menu.

## EEPROM

Electrically erasable programmable read-only memory. This is a special type of PROM that can be erased by exposing it to an electrical charge, though EEPROM retains its contents even when the power is turned off. EEPROM is similar to flash memory. Like other types of ROM, EEPROM is not as fast as RAM.

## Equipment Load

Any equipment which connects with the UPS for its power.

## Fault

A malfunction which causes a machine or application to fail to perform as designed.

## FlexEvent

An event that you can configure to define how PowerChute *plus* responds to a specific situation.

## Folder

A list of files and sub-files stored on a machine.

## Frequency

Usually expressed as Hertz (Hz), the number of times an alternating current reverses direction in one second. This completes one cycle, which equals one Hertz.

## Hardware

The physical components of a system, including the central processing unit (CPU), memory, disks, and cables.

## Host

In APC's terminology, the machine which runs the PowerChute *plus* User Interface Module, or PowerNet SNMP Manager application.

## HTML (Hypertext Markup Language)

A system of encoding documents for electronic publication on the Web.

## Hypertext

A method of electronically linking information for on-screen display.

## Icon

A graphic symbol for a program, file or document.

## Initialization File

The file which controls the behavior of PowerChute *plus*. See Configuration.

## Interface

The part of a machine or application that allows interaction with another machine, application, or user.

## IP Address (Internet Protocol Address)

A unique, numerical identification, which identifies each machine connected to a TCP/IP network.

## IPX Address (Internetwork Packet Exchange Address)

A unique, numerical identification, which NetWare systems use to identify each machine connected to the network.

## LAN (Local Area Network)

A group of interconnected servers and workstations functioning within a specific, limited area, such as an office, building, or corporation.

## Load

The amount of power required by the equipment plugged into the UPS.

## Log File

A record of events, actions or data.

## Machine

A generic term for a personal computer, workstation, terminal or server.

## Menu Bar

A set of menus, each providing a drop-down list of options.

## MIB (Management Information Base)

For APC, a set of object identifications (OIDs) an SNMP browser can use to monitor or control a UPS, Measure-UPS, or MasterSwitch.

### Monitor

To track the performance of software, hardware, or changes in environmental conditions.

### Mouse

A device used (as an alternative to keystrokes) to move the cursor or to make on-screen selections.

### NetWare

A network operating system created by Novell.

### Network

A group of machines connected with each other for communication, or to share resources, such as files or print servers.

### Online Documentation

Instructions available for viewing on a machine's screen.

### Online Help

Information available for display from within an application to help operators use the application.

### Operating System

The control program of your computer or network. It is the first program loaded when you turn on the computer, and it manages the operation of the computer, including tasks, data, peripheral devices, and security.

### Overload

An equipment load greater than the amount of voltage the UPS can safely provide.

### Parameter

A setting with optional values defining how the machine or application will perform.

### Path

The route that must be followed by a program or user to access a specific directory or file on a disk.

### Permissions

Authorization to access specific machines, files, or programs in a network.

### Poll

To access information from a machine or application at regular, pre-determined intervals.

### Popup Menu

A list of choices (displayed in front of the present window) which disappears after the user makes a selection.

## Protocol

A set of rules that governs the way data is conveyed through a network.

## Radio Buttons

A set of options, usually small circles, that limit a user to one selection at a time by automatically disabling all other options when one is chosen.

## Reboot

To restart the computer and operating system.

## Reinstall

To repeat the installation process to replace corrupted files or to add a component or feature.

## Runtime

How long the UPS can provide power to support the equipment load if the UPS goes on battery.

## Scroll

To use a mouse, keyboard arrow keys, or a scroll bar to move through a display to view information which the display cannot show all at once.

## Self Test

A series of functions and operations, performed by a device to verify its own operation.

## Server

A machine or application which provides a network with a central source of information, programs, files or services.

## Shut Down

To close all applications and turn off the operating system.

## SmartBoost

During AC undervoltage conditions, a UPS normally switches to battery power in order to supply the correct voltage to user equipment. With SmartBoost, the UPS can actually correct the incoming voltage and restore it to its correct value without using any battery power. This feature extends battery life.

## SmartTrim

This feature automatically cuts voltage supplied to your computer system when it's too high.

## SMTP (Simple Mail Transfer Protocol)

The e-mail protocol most commonly used on the Internet.

## SNMP (Simple Network Management Protocol)

A network management protocol used on the Internet.

## Spike

A sudden, very brief increase in voltage.

## Surge

A measured increase in voltage which lasts longer than a spike.

## Symmetra *Power Array*

The Symmetra *Power Array* from APC is hardware for the mid-sized power protection industry. Working as a single unit composed of modular components, it provides redundancy, scalability, manageability, and serviceability.

## Threshold

A setting defining the boundary between a normal condition and an abnormal condition.

## Uninstall

To remove an application from a machine, usually by using a file or application specifically designed for that purpose.

## UPS (Uninterruptible Power Supply)

A device that can use one or more batteries to provide back-up power to its equipment load during power disturbances or interruptions.

## UPS Monitoring Module

The PowerChute *plus* component which communicates with the UPS and the PowerChute *plus* User Interface Module, logs data and events, notifies users of impending shutdowns and shuts down the operating system, when required.

## User Interface Module

The PowerChute *plus* component which directly interacts with the user.

## Utility Line Voltage

The voltage (in VAC) being supplied by power companies.

## VAC (Voltage Alternating Current)

See Utility Line Voltage.

## Voltage

The power used by electrical devices.

## Voltage Conditioner

A filter for AC power that provides protection to supported equipment in cases of power surges and minor power irregularities, but not in cases of power sags, brownouts, or complete power loss.

## Wiring Closet

The central convergence point for cables in a local area network (LAN), and often the location where the network is serviced.

## Window

A display that an application utilizes to provide information to a user.

## WorkSafe

The PowerChute *plus* feature that saves the data in open applications when a shutdown occurs.

## Workstation

A single-user machine which allows a user to access shared network services or work independently.

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